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BULLETIN

OF

THE AMERICAN MUSEUM OF NATURAL HISTORY

VOLUME LIV, 1927

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REHN–HEBARD
NICHOLS–POPE
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SCHMIDT

NEW YORK
PUBLISHED BY ORDER OF THE TRUSTEES
1927

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EDITED BY FRANK E. LUTZ

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" V, October 14, 1927.

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[1] The Title-page, Table of Contents, and Index to this volume (LIV) published June, 1931.

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ERRATA

Page 157, line 15 from bottom, for *galeodes* read *galeoides.*
" 158, line 1 from bottom, for *avipennis* read *flavipennis.*
" 328, line 2 from top, for *Fluta alba xanognatha* read *Fluta alba xanthognatha.*
" 352, line 20 from bottom, for *sotdatovi* read *soldatovi.*
" 525, in caption for Fig. 15, for new species read new subspecies.

BULLETIN

OF

THE AMERICAN MUSEUM OF NATURAL HISTORY

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Article I.—THE ORTHOPTERA OF THE WEST INDIES NUMBER 1. BLATTIDÆ

BY JAMES A. G. REHN AND MORGAN HEBARD

THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA

PLATES I TO XXV

A number of years ago Dr. Frank E. Lutz, Curator of Entomology in The American Museum of Natural History, placed in our hands for study a small collection of Orthoptera from the island of Dominica, which was followed from time to time by series from Cuba, Hispaniola, Jamaica, and that from Porto Rico taken on the New York Academy of Sciences' survey of the latter island. The study of these series progressed very slowly by reason of various impediments, but the delay has, as a whole, proved beneficial by having altered the original character of the studies. Numerous other series, chiefly small but of great importance, received from other sources during the progress of the work, made it desirable to change the contemplated report into a comprehensive study of the Orthoptera of the West Indies. The large proportion of the species known from the Antilles, which were contained in the combined collections, forced a realization of the desirability, from a variational as well as a distributional standpoint, of presenting our results in a single series.

When the general conclusions had been sufficiently analyzed to make evident some of the more important gaps in our knowledge of the Orthoptera of the West Indies, the senior author made a special examination of the Blue Mountain region of Jamaica to secure material from that most interesting area, regarding the Orthoptera of which but little information was available.

The scope of the study will be the orthopterous fauna of the Greater and Lesser Antilles, Trinidad and Tobago being considered South

America and therefore excluded from our treatment. The collections from the Greater Antilles are quite representative, although certain regions, as the more elevated sections of eastern Cuba and the higher areas of Hispaniola, have received but little attention. With the representation from the Lesser Antilles we feel much less satisfied, as no work even approximating a comprehensive character has been done on any of the islands except Antigua, Dominica, St. Lucia, St. Vincent, Grenada and Barbados, with the other islands represented only by scattered records. It is greatly desired that thorough field work be done at an early date on such of the islands as have not been completely altered by man, as by this method alone can we secure a fair idea of the endemic fauna before the primæval conditions are obliterated. Work on islands which have been markedly changed by cultivation is also of importance, as certain peculiar species may remain, adapted to a new character of environment due to the cultivation of the land.

The more important contributions to our knowledge of the Orthoptera of the West Indies are not numerous, when allowance is made for the close association which for so long has existed between the various islands and European countries. The more noteworthy papers number fourteen, and are listed below.[1] Bolivar's Cuban 'Enumération' can well be selected

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Bahamas

[1] Morse, Albert, P. 1905. 'Some Bahaman Orthoptera.' Psyche, XII, pp. 19–24.

Rehn, James A. G. 1906. 'The Orthoptera of the Bahamas.' Bull. Amer. Mus. Nat. Hist., XXII, pp. 107–118.

Cuba

Guérin-Méneville, F. E. 1857. In Sagra, Ramon de la., 'Histoire Physique, Politique et Naturelle de l'Ile de Cuba. Amimaux Articulés a Pieds Articules. Orthoptera,' pp. 328–358, Pl. xii.

Bolivar, Ignacio. 1888. 'Enumération des Orthoptères de l'Ile de Cuba.' Mem. Soc. Zool. France, I, pp. 116–164.

Gundlach, Juan. 1890–1891. 'Contribucion á la Entomologia Cubana.' II, Pt. 4, 'Ortópteros,' pp. 289–396.

Rehn, James A. G. 1909. 'A Catalog of the Orthoptera of Cuba and the Isle of Pines.' Second Report of the Central Experimental Station of the Republic of Cuba, pp. 175–226.

Porto Rico

Gundlach, Juan. 1887. 'Ortópteros. Fauna Puerto-Riqueña.' Ann. Soc. Españ. Hist. Nat., XVI, pp. 138–150.

Rehn, James A. G. 1903. 'Notes on West Indian Orthoptera, with a List of the Species known from the Island of Porto Rico.' Trans. Amer. Entom. Soc., XXIX, pp. 129–136.

Rehn, James A. G. 1910. 'On Some Orthoptera from Porto Rico, Culebra and Vieques Islands.' Bull. Amer. Mus. Nat. Hist., XXVIII, pp. 73–77.

Wolcott, George N. 1923. 'Insectæ Portoricensis. A Preliminary Annotated Check-list of the Insects of Porto Rico, with Descriptions of Some New Species.' Journ. Dept. of Agr. of Porto Rico, VII, No. 1, pp. 5–313. (Orthoptera, pp. 17–30.)

Antigua

Caudell, A. N., 1922. 'Report on Orthoptera and Dermaptera collected by the Barbados-Antigua Expedition from the University of Iowa in 1918.' Univ. of Iowa Studies in Nat. Hist., X, No. 1, pp. 19–44.

St. Vincent

Brunner von Wattenwyl and Redtenbacher, J. 1892. 'On the Orthoptera of the Island of St. Vincent, West Indies.' Proc. Zoöl. Soc. London,' 1892 pp. 196–221, Pls. xv-xvii.

Grenada

Brunner von Wattenwyl. 1893. 'On the Orthoptera of the Island of Grenada, West Indies.' Proc. Zoöl. Soc. London, 1893, pp. 599–611, Pl. lii.

Barbados

Rehn, James A.G. 1905. 'Notes on a Small Collection of Orthoptera from the Lesser Antilles, with the Description of a New Species of *Orphulella*.' Entom. News, XVI, pp. 173–182, Pl. viii.

Caudell, A. N. See above under Antigua.

as the most important of these systematically, while Gundlach's Cuban and Porto Rican studies are the most valuable in the way of habitat observations. In no case, however, do any of these papers approximate the exhaustive character which is so essential in present-day faunistic work, although their great value and intrinsic merit is conceded.

The present paper, the first contribution of the series, treats of the Blattidæ, or cockroaches, one of the most difficult and taxonomically the most sadly involved of the West Indian families of the order. The taxonomic questions have frequently made necessary exhaustive comparisons with Central and South American forms, with which West Indian material has been confused. The possession in the Philadelphia collections of the mainland forms involved, has made the results far more definite and faunistically more significant than would otherwise have been possible.

In the present study forty-seven genera of Blattidæ are treated, of which nine are described as new. One hundred and fifty-six species are admitted as West Indian, of which sixty-six were previously undescribed. Of the total number, we have examined West Indian material of all but sixteen species, while of this assemblage five are of doubtful validity as specific entities or as West Indian forms. Fourteen names which have stood as valid species in the literature are here synonymized for the first time, while seven previously little-known or imperfectly understood species are first correctly placed and compared.

In the present study we have made no effort to present any general conclusions as to the relationship of the faunas of the different islands, or their possible derivation, neither have we endeavored to analyze the information here presented from the standpoint of the general origin or origins of the West Indian orthopterous fauna. Our intention is to discuss the faunistic and geographic evidence secured from the collections of the whole order, in a summary at the close of the series, there presenting any conclusions which may be reached on the basis of evidence collated from the systematic treatments.

The total number of specimens of Blattidæ examined is 1292, the larger representations being from the following collections: American Museum of Natural History, 463; Academy of Natural Sciences of Philadelphia, 393; Hebard Collection, 176; United States National Museum, 122; Paris Museum, 36 and Museum of Comparative Zoölogy, 34, while series have also been examined from the Davis Collection, Cornell University, Porto Rico Department of Agriculture, Brooklyn Institute of Arts and Sciences, Jamaica Department of Agriculture, British Museum of Natural History, and the Museum of the University of Michigan.

We wish to express our thanks to the officials of the above institutions for their kind coöperation, while particular obligation should be expressed to Mr. Charles T. Ramsden, of Guantanamo, Cuba; Senor José Cabrera, of Cotorro, Cuba; Mr. C. C. Gowdey, Government Entomologist of Jamaica, and Mr. George N. Wolcott, Chief of the Division of Entomology of the Department of Agriculture of Porto Rico, for their cordial responses to inquiries, and the liberality with which they placed in our hands material of great service in this study. It is a pleasure to acknowledge the kind assistance rendered by Mr. B. Uvarov, of the British Museum of Natural History, who compared material and sketches with Walkerian types in that institution and supplied drawings and notes bearing on doubtful determinations.

The material referred to in the following pages without indication of source is understood to be in the collection of The American Museum of Natural History, while the representations from other institutions are accompanied by the name of the institution or a suitable abbreviation of the same.[1]

Ectobiinæ

Anaplecta lateralis Burmeister

A[naplecta] lateralis Burmeister, 1838, 'Handb. der Entom.,' II, Abth. 2, pt. 1, p. 494. Colombia.

Brunner[2] has recorded this species from the Chantilly Estate, Grenada, and we have had the opportunity of examining a single individual of this material, belonging to the British Museum. This specimen lacks the abdomen and no comparison of genital appendages or abdominal characters can be made. The wing structure and the pronotal and tegminal features fully agree with a considerable series of *lateralis* from Panama. We have compared the Grenada specimen with material of *A. grandipennis*, *replicata*, *fallax*, *domestica*, *decipiens*, and the form which we feel probably represents DeGeer's *minutissima*, described from the Guianas. From all of these the Grenada material is appreciably different. It is probable that *lateralis* will be found to have an extensive range in northern South America.

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[1] A. N. S. P. = The Academy of Natural Sciences of Philadelphia; Heb. Cln. or Hebard Cln. = Hebard Collection at The Academy of Natural Sciences of Philadelphia; U. S. N. M. = United States National Museum; Paris Museum = Museum National de Histoire Naturelle, Paris, France; M. C. Z. = Museum of Comparative Zoölogy; Davis Cln. = Collection of William T. Davis; P. R. Dept. of Agr. = Porto Rico Department of Agriculture; Brooklyn Inst. = Brooklyn Institute of Science and Art; Jam. Dept. of Agr. = Department of Agriculture of Jamaica; Brit. Mus. Nat. Hist. = British Museum of Natural History; Univ. of Mich. Mus. = Museum of the University of Michigan.

[2] 1893, Proc. Zoöl. Soc. London, 1893, p. 601.

There is no other West Indian record of this genus, which is tropical African and American, but predominatingly tropical American. However, all the species are small and easily overlooked, even where numerous.

Pseudomopinæ

This subfamily is an enormous complex, comprising a great number of genera and a multitude of species, distributed over the entire world. But a single species (*Blattella germanica*) has developed a really cosmopolitan distribution, although a number of the forms are widely distributed within the tropics. The complexity of structure in the species of this subfamily is most extraordinary, particularly in the way of genital and secondary sexual features of the male sex. Taxonomic work in this division of the Blattidæ is extremely difficult, as but a limited portion of the species of the world known today have been studied in the light of modern standards for generic entities and genera groups.

We are presenting here a key to the genera of the subfamily found in the West Indies, an admittedly artificial dichotomous table which will serve, we trust, to aid the student in correctly placing most of his material. It has been constructed largely from the key to the described American genera of the subsidiary group Blattellæ published by the junior author in 1920.[1] This has been condensed to include the then known genera occurring in the West Indies, the new ones of the group here described have been added and the other groups of the subfamily have been analyzed, added, or interpolated. We are fully aware of the artificial character of this key and do not wish it to be regarded as the authors' conception of a phylogenetic presentation of the genera, but the production of a more logically natural key is not possible until we know more of the South American forms of the subfamily. We sincerely hope to be able to present a comprehensive table for the genera, or at least the American ones, of the Pseudomopinæ in the not distant future.

Genera of the Pseudomopinæ Occurring in the West Indies

1. Ulnar vein of wing with all rami complete, reaching to distal margin of wing. . 2.
   Ulnar vein of wing with distal rami complete and reaching to distal margin of wing, proximal rami incomplete and short, diverging toward dividing vein and not reaching distal margin of wing. (Ischnopteræ) . . . . 11.
2. Ventro-cephalic margin of cephalic femora with a row of spines which decrease suddenly in size mesad, those distad and before apical group being piliform, termed "type B"; or armed with a row of spines which are entirely piliform. (Tarsal claws unspecialized.) . . . . 3.

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[1] Mem. Amer. Entom. Soc., No. 4, pp. 26–28.

Ventro-cephalic margin of ventro-cephalic femora with a row of spines which decrease gradually in size, termed "type A." (Arolia present.) .... 6.

3. Pulvilli on fourth tarsal joint only[1] .... 4.
Pulvilli on all four proximal tarsal joints. (Ventro-cephalic margin of cephalic femora with group of three heavy distal spines.) .... 5.

4. General form depressed, deplanate, delicate. Ventro-cephalic margin of cephalic femora with group of three heavy distal spines. Tegmina elongate, with discoidal sectors perfectly longitudinal. Tegminal color pattern venational in disposition. Dorsal surface of male abdomen with sixth tergite specialized .... *Euphyllodromia* Shelford.
General form ovate, subconvex, robust. Ventro-cephalic margin of cephalic femora with group of two heavy distal spines. Tegmina never elongate, subcoriaceous, with discoidal sectors oblique or occasionally subobsolete (*A. gemma*). Tegminal color pattern not venational in disposition. Dorsal surface of male abdomen unspecialized .... *Aglaopteryx* Hebard.

5. Tarsal claws asymmetrical. Tegmina with discoidal sectors oblique. Dorsal surface of male abdomen specialized. (Form broad.) .. *Latiblattella* Hebard.
Tarsal claws symmetrical. Tegmina with discoidal sectors longitudinal. Dorsal surface of male abdomen unspecialized .... *Chromatonotus* Hebard.

6. Tegmina with discoidal sectors oblique. Tegmina and wings fully developed in male, reduced in female. (Tarsal claws unspecialized. Inter-ocular-ocellar area raised and flattened, particularly in male.) .... *Supella* Shelford.
Tegmina with discoidal sectors longitudinal. Tegmina and wings fully developed in male, fully developed or slightly reduced in female .... 7.

7. Ventro-cephalic margin of cephalic femora with group of two heavy distal spines. Tarsal claws specialized on margins .... 8.
Ventro-cephalic margin of cephalic femora with group of three heavy distal spines. Tarsal claws unspecialized .... *Blattella* Caudell.

8. Ventro-caudal margin of cephalic femora with two spaced and one distal spine.[2] (Size small for group. Dorsal surface of male abdomen unspecialized.) *Cariblatta* Hebard.
Ventro-caudal margin of cephalic femora with three or more spaced and one distal spines. (Dorsal surface of male abdomen unspecialized or specialized.) .... 9.

9. Head not strongly depressed and transverse, face not strongly deplanate. Pronotum transverse ovate or moderately elliptical, very rarely strongly transverse elliptical. Scapular field of tegmina of moderate width, distinctly less than equal or subequal to that of discoidal field of same. Form of tegmina elongate elliptical .... 10.
Head very strongly depressed and transverse, face strongly deplanate. Pronotum very strongly transverse elliptical. Scapular field of tegmina very broad, near middle of tegmina slightly broader than discoidal field at same point. Form of tegmina more acute, ovate lanceolate. (Dorsal surface of male abdomen unspecialized.) .... *Nymphodromia*, new genus.

10. Size small; form elongate, very slender. Tegmina narrow. Pronotum markedly deplanate. Tarsal claws with ventral margins weakly specialized. (Coloration marked bicolored.) .... *Cariblattoides*, new genus.

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[1] Occasionally by the loss of one joint the pulvillus appears to be on the third joint.

[2] Rarely more than two spaced spines are present, but this condition is quite the exception.

Size medium small to relatively large (for the group); form elongate elliptical, very rarely as slender as in *Cariblattoides*. Tegmina more lanceolate. Pronotum less deplânate (except in *carrikeri* group). Tarsal claws with ventral margins distinctly specialized. . . . . *Neoblattella* Shelford.

11. Ventro-cephalic margin of cephalic femora armed with heavy proximal spines, succeeded distad by a series of minute, closely-set piliform spines, and finally three heavy elongate distal spines. . . . . 12.

Ventro-cephalic margin of cephalic femora armed with heavy elongate spines, decreasing gradually in length distad to three longer distal spines. (Pronotum having disk without diverging sulci.). . . . . 14.

12. Pronotum with disk bearing a pair of distinct diverging sulci. Tegmina well developed at least in the male sex. Arolia present. . . . . 13.

Pronotum with disk bearing no sulci, regularly convex. Tegmina reduced, not reaching to middle of abdomen. Arolia absent. . *Nelipophygus*, new genus.

13. Discoidal vein of wing undivided. Sixth and seventh tergites of male highly specialized, former bearing mesad on ventral surface a moderately projecting pair of chitinous "combs." (Discoidal sectors of tegmina weakly radiating.). . . . . *Ischnoptera* Burmeister.

Discoidal vein of wing bifurcate. Sixth and seventh tergites of male little specialized, former without median pair of chitinous "combs." (Discoidal sectors of tegmina longitudinal.). . . . . *Pseudosymploce*, new genus.

14. Fully alate or with truncate tegmina in female sex only (*S. hospes*). Pronotum with caudal margin obtusely produced mesad. Proximal abdominal tergite of male specialized. . . . . *Symploce* Hebard.

Both sexes with reduced truncate or subtrigonal tegmina. Pronotum with caudal margin not produced mesad. Proximal abdominal tergite of male unspecialized. . . . . *Nesomylacris*, new genus.

AGLAOPTERYX Hebard

This tropical American genus is known only from three species, two of which are found in the West Indies, while the third (*A. lita*) is a Panamanian insect.

KEY TO THE WEST INDIAN SPECIES

Tegmina reaching nearly or quite to apex of abdomen, distad never truncate. Wings present but reduced. Ventro-cephalic margin of cephalic femora with distal group of spines numbering two to three. (Male genitalia distinctive. Solely West Indian and Bermudan in distribution.) *diaphana* (Fabricius).

Tegmina reaching only to proximal abdominal segments, distad sharply truncate. Wings absent. Ventro-cephalic margin of cephalic femora with a single distal spine. (Male genitalia distinctive. Southeastern United States and Bahamas.). . . . . *gemma* Hebard.

Aglaopteryx diaphana (Fabricius)

B[latta] diaphana FABRICIUS, 1792, 'Entom. Syst.,' II, p. 11. Islands of South America (West Indies).

Cuba.—Camoa, Havana Province, X, 1918, (José Cabrera), 1 ♀, [A. N. S. P.]. Santiago, Oriente Province, VIII, 21, 1920, (M. Hebard; from under corky bark of large tree in open), 1 ♂, [Hebard Cln.].

Jamaica.—Montego Bay, X, 29, 1913, (M. Hebard; in bromeliad on forest tree with *Nyctibora lævigata* and numerous *Cariblatta insularis*), 1 ♀, [Hebard, Cln.].[1] Pleasant Hill, Blue Mountains, 3660–3800 feet, VII, 24 and 25, 1923, (Rehn; from under loose bark of shade trees and hiding in banana blossom bracts), 6♂, 3♀, 1 immat. ♂, 2 immat. ♀, [A. N. S. P.]. Between Pleasant Hill and St. Helens Gap, Blue Mountains, 4400–4700 feet, VII, 24 and 25, 1923, (Rehn; in montane forest, from bromeliads, hollow bases of dead tree fern fronds and from under bark), 1♂, 1♀, 3 immat. ♂, 4 immat. ♀, [A. N. S. P.].

Hispaniola.—Aux Cayes, Haiti, III, 15–20, 1922, (F. E. Watson), 1 immat. ♂.

Porto Rico.—Cayey, Guayama Dept., III, 16, 1917, (R. T. Cotton), 1 ♂, 1♀, [U. S. N. M.].

Dominica.—Long Ditton, VI, 19, 1911, (Crampton and Lutz), 1♀.[1]

This beautiful West Indian species is now known to range from the Bermudas, Bahamas (Andros Island) and Cuba, east and south to Barbados, the definite records being from the Bermudas, Bahamas, Cuba, Jamaica, Hispaniola, Porto Rico, Culebra Island, Mona Island, St. Thomas, Dominica and Barbados. Hebard, in his study of the Blattidæ of North America,[2] has given full notes on the species.

Seín has reported the species as occurring in Porto Rico "under bark of trees, in abandoned cocoons of the 'plumilla' (*Megalopyge krugii*), also in leaves webbed together by caterpillars and in abandoned spider nests." Wolcott has reported it from Tallaboa, Pt. Salinas, Cayey, Ciales, Adjuntas and Lares in the same island, and given the following variety of habitats: on rotten wood fence, in empty cocoons of *Megalopyge krugii* on trunks of bucare trees (*Erythrina glauca*), on trunk of *Inga laurina* and in larval tents of *Tetralopha scabridella* on *Inga vera*.

The series from the Blue Mountains of Jamaica exhibits a considerable amount of variation in size, but by no means sufficient to cause any confusion in the recognition of this beautifully marked species. The anchor-shaped median marking of the pronotal disk, which is usually indicated, occasionally disappears, in both adults and immature individuals. This is true of Cuban as well as of Jamaican individuals.

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[1] Recorded by Hebard, 1917, Mem. Amer. Entom. Soc., No. 2, p. 32, footnote 40.

[2] Idem.

Aglaopteryx gemma Hebard

Aglaopteryx gemma Hebard, 1917, Mem. Amer. Entom. Soc., No. 2, pp. 12, 32, Pl. i, figs. 9–12. ♂, ♀; Mobile, Alabama (type locality) and numerous other localities in Texas, Louisiana, Mississippi, Alabama, Georgia and Florida, and Nassau, New Providence, Bahamas.

This species is closely related to, but well distinct from, *A. diaphana*, which it replaces in the southeastern United States, the differences being well set forth in the original description. The only West Indian record of the species is that from Nassau, quoted above. Seven adults from this locality, representing both sexes, taken in January and February, were examined.

It is quite possible that the occurrence of *gemma* in the Bahamas may be due to its accidental introduction from southern Florida, the latter region being in constant touch commercially with the Bahamas. Knowing the secretive habits of the species, the possibility of such an introduction is to us perfectly logical.

LATIBLATTELLA Hebard

This genus is highly developed in continental tropical America, with two species occurring in the United States, one in the extreme southeastern portion (southern Florida) and the other in the southwestern section (southern Arizona). The first of these, *L. rehni* Hebard, occurs also in western Cuba and in the Bahamas. This species and a second one from Jamaica are the only representatives of the genus definitely known to date from the West Indies.

Latiblattella rehni Hebard

Latiblattalla rehni Hebard, 1917, Mem. Amer. Entom. Soc., No. 2, pp. 12, 38, Pl. i, figs. 13–17. ♂, ♀; Newberry, Lakeland, Fort Myers, Punta Gorda, Everglade, Marco, Chuluota, Deerfield, Fort Lauderdale, Ojus, Miami (type locality), Cocoanut Grove, Homestead, Dade County and Big Pine Key, Florida.

Bahamas.—No exact locality, II–V, 1896, [immature specimen], (U. S. Fish Commission), 1 ♀,[1] immat. 1 ♀, [U. S. N. M.].

Cuba.—Twelve and one-half kilometers south of Pinar del Rio, Pinar del Rio Province, IX, 12–23, 1913, (Leng; beaten from pine), 1 immat. ♀.

The Bahaman adult is unusually small when compared with an extensive Floridian series, and, in addition, has the pronotum somewhat more deflexed laterad. The latter condition can be explained by shrivelling, as both of the Bahaman individuals have been dried from alcohol. There can be no question, however, but that the Bahaman and Cuban specimens listed above are identical with typical material of this hitherto peculiarly Floridian species. While its occurrence in the Bahamas and Cuba might be considered due to accidental introduction, as suggested above in the case of *Aglaopteryx gemma*, it would seem that in Cuba, at least, the habitat notes given above militate against such an interpretation. The Bahaman female measures: length of body, 9.6 mm.; length of pronotum, 2.7; greatest width of pronotum, 4; length of tegmen, 9.8; greatest width of tegmen, 3.3.

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[1] This is the specimen recorded by Rehn (1906, Bull. Amer. Mus. Nat. Hist., XXII, p. 110) as *Blattella adspersicollis*, a name at one time erroneously current for the present species.

In coloration the Bahaman immature specimen has a broad dark band crossing the middle of the dorsum of the abdomen, embracing the fourth and fifth and incompletely suffusing the second and third tergites. The immature specimen from south of Pinar del Rio has the abdomen almost wholly piceous, both above and below, being more uniformly darker on this portion of the body than any Floridian immature specimen seen. The face of this individual is also solidly piceous.

Latiblattella species

JAMAICA.—Balaclava, St. Elizabeth Parish, IV, 15, 1909, (A. E. Wight), 1 ♀, [M. C. Z.].

This single specimen demonstrates the presence of the genus *Latiblattella* in Jamaica, but unfortunately, being a female, its definite determination is very difficult, if possible. The Jamaican individual is exceedingly close to, if distinct from, *L. angustifrons* Hebard,[1] described from Panama, which, however, is known only from the male sex, and in consequence suitable comparison cannot be made. Future work may show that the Panamanian species has been accidentally introduced in Jamaica, possibly through the means of oöthecæ in soil about plants brought back by returned Canal laborers, but it will be necessary to await the receipt of Jamaican males or females from Panama before this question can be definitely settled. The genus *Latiblattella* is a difficult one at best, and without accompanying males we do not wish to place a definite determination on this specimen, although the presence of the genus in Jamaica should be established.

For the benefit of future workers we give the measurements of this Jamaican female: length of body, 12 mm.; length of pronotum, 2.8; greatest width of pronotum, 4.1; length of tegmen, 10.4; greatest width of tegmen, 3.4.

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[1] 1920, Mem. Amer. Entom. Soc., No. 4, p. 39, Pl. II, fig. 22. ♂.

Supella supellectilium (Serville)

Blatta supellectilium Serville, 1839, 'Hist. Nat. Ins., Orth.,' p. 114. ♂, ♀; Mauritius.

Ischnoptera vacillans Walker, 1868, 'Catal. Blatt. Brit. Mus.,' p. 114. ♂; "St. Domingo."

Cuba.—Pinar del Rio, Pinar del Rio Province, IX, 9–24, 1913, (Leng; in hotel), 1♂. Havana, 1♂, [Paris Museum]. Baracoa, Oriente Province, VIII, 1905, (A. Busck), 2♂, [U. S. N. M.].

Jamaica.—Kingston, X, 24, 1913, (M. Hebard; in hotel larder), 1♂, [Hebard Cln.]; (Cockerell), 1♀, [U. S. N. M.]. Mandeville, Manchester, about 2250 feet elevation, XI, 26–28, 1919, (F. E. Watson; caught at light), 1♂. Montego Bay, XI, 3, 1913, (M. Hebard), 1♀, [Hebard Cln.].

Hispaniola.—Port-au-Prince, Haiti, 2♂, 5♀, [Paris Museum]; about 300 feet elevation, II, 1–5, III, 21–29, 1922, (F. E. Watson; caught at light), 1♂, 1 immat. ♀. La Moriniere, Haiti, about 125 feet elevation, III, 1–5, 1922, (F. E. Watson; caught at light, pair in coitu), 2♂, 1♀, 1 immat. ♂. San Francisco Mountains, 13 kilometers north of San Cristobal, Province of Santo Domingo, Dominican Republic,[1] IX, 1905, (A. Busck), 2♀, [U. S. N. M.].

Porto Rico.—San Juan, 2 ♀, [Paris Museum].

Uvarov has kindly examined the type of Walker's *vacillans* and sent us a sketch of the genitalia. His suggestion as to the synonymy of *vacillans* under *supellectilium* is amply supported by a re-examination of the original description, and the genitalic sketch is adequate corroboration. *Vacillans* was based on a pale individual of the species, with tegmina pattern not at all distinct, and we here add another to the long list of synonyms already established.

This circumtropical domiciliary species has been reported from all the Greater Antilles and Barbados, and also occurs in southern Florida. The synonymy is quite extensive, but there is no necessity for its repetition in this connection. The sexes are quite different in general proportions, and the species is very variable in color intensity. Seín states that in Porto Rico it occurs in houses in company with *Blattella germanica*, while both Gundlach and Wolcott report it from similar habitats in that island, the former from Mayaguez, the latter from Condado, Lares and Arecibo.

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[1] This locality is apparently intended for the group of hills surrounding Naranja Dulce on the Rio Nigua, thirteen kilometers north of San Cristobal, in which region is also the Blanton copper mine referred to elsewhere in this paper. Mr. Busck writes me as follows: "The designation San Francisco Mts., San Domingo is a very poor one and was used by me because at the time—1904—it was a local name used by the few natives in the region where I lived for a few months. I was never able to find it on any map. The locality was in the province of San Domingo, just northeast (*sic*) of Santo Domingo City, one long day's journey (fourteen hours) by mule from the city. There was no town or settlement of any kind, just an old house formerly occupied by a copper mining company. All collections labelled San Francisco Mts. come from localities reached by foot or by mule on one day excursions from that house."

With the aid of the recently issued report of the Geological Survey of the Dominican Republic (1921, Memoirs I, Geological Survey of the Dominican Republic, pp. 236–242, Pl. xxiii), we are able to locate the San Francisco copper property, and find it was near Naranja Dulce on the Rio Nigua, thirteen kilometers north of the town of San Cristobal. It is quite possible that the settlement now called Naranja Dulce includes the house referred to by Mr. Busck.

Cariblatta Hebard

This genus of small cockroaches has its center of greatest differentiation in the West Indies, and specifically the Greater Antilles, Jamaica alone possessing nine of the twenty-seven forms of the genus, all except two peculiar to the island. We believe the genus originated in South America, where it is represented by at least six species, this total including a single Panamanian species, as well as Trinidadian forms. No species are known from Central America north of Panama, or from Mexico, while two forms of a single species (*C. lutea*)occur in the lower sections of the southeastern United States, but do not extend west of the Mississippi River as far as known. This latter species doubtless reached the southeastern United States through or from the West Indies, where one of its forms and all of its near relatives at present occur.

The West Indies possess twenty of the twenty-seven forms of the genus, and of the twenty all but two are restricted to the Greater Antilles and the Bahamas, while these two are limited in distribution to certain of the Lesser Antilles and the Virgin Islands. One species (*delicatula*) has a relatively wide distribution, occurring in all the Greater Antilles except Porto Rico, and also in the Bahamas. This form is not only the most plastic member of the genus, but is also one of the two forms known from Cuba, compared with which, as stated above, nine species are definitely known from Jamaica.

In 1916 the junior author erected the genus *Cariblatta* and published a revision of the genus[1] which has furnished the ground work for the present much more detailed study of the West Indian forms. The handicap at that time was lack of sufficient material to enable the student to secure a suitably definite idea of the variability of one relatively plastic species, i. e., *delicatula*, there called *punctulata*. In consequence, the true range of variation of that, the most widely distributed, species was considered to be greater than we now know to be the case, and certain material there referred to *delicatula* has been found to represent distinct and undescribed species. Features of pronotal pattern elements, elements of facial pattern, interocular width and to a lesser degree tegminal pattern have been found to indicate group affinities, while the very great differentiation of the male genitalia, almost entirely of the subgenital plate and styles, is mainly specific and often but little in the way of group affinities is there shown.

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[1] Trans. Amer. Entom. Soc., XLII, pp. 147–186, Pls. XI–XIII.

The distribution of the West Indian species of *Cariblatta* may be graphically presented as follows:

	Bahamas	Cuba	Jamaica	Hispaniola	Porto Rico	Lesser Antilles
Reticulosa Group						
reticulosa			*		*	
nebulicola			*			
Delicatula Group						
craticula					*	
picturata					*	
unguiculata				*		
glochis	*					
leucops				*		
delicatula	*	*	*	*		
lutea minima		*				
Cuprea Group						
cuprea			*			
orestera			*			
punctipennis						*
Insularis Group						
cryptobia			*			
islacolonis				*		
plagia					*	
stenophrys					*	
antiguensis						*
jamaicensis			*			
insularis			*			
landalei			*			

Hebard in 1916 recognized without names three groups of the genus. It has been necessary to modify considerably this arrangement, and tentatively recognize six groups: the *Reticulosa* Group, the *Delicatula* Group, the *Cuprea* Group, the *Fossicauda* Group, the *Insularis* Group and the *Personata* Group. Of these, the *Fossicauda* and the *Personata* Groups do not occur in the West Indies. The features which we have provisionally utilized to distinguish the groups are often quite subtle and less evident than the male genital characters, which, while of great specific importance, indicate less the probable derivation and phylogenetic relationship.

As is so frequently the case in the Blattidæ, the determination of females without accompanying males is exceedingly difficult, and the differential features here given are almost entirely those of the male sex. A careful study of the pronotal form and pattern, facial and abdominal patterns and, after proper allowance is made for sexual difference, the interocular width, will generally furnish some clues to the location of females, but the differences thus available are usually quite subtle and, without series for comparison, exceedingly difficult to analyze correctly.

With a genus having differential specific characters as difficult to express in words as the present one, the construction of a dichotomous key is exceedingly hard, and at best the result is never completely satisfactory to the reviser. The need for such a key is, however, so imperative that, with a full comprehension of its occasional lack of contrasted definiteness, we have endeavored to construct one which in most cases will prove satisfactory to the student. In every case, nevertheless, we would suggest that use be made of the figures accompanying this paper, or those to which reference is made in the body of the text. It has been necessary to limit the key to the features of the male sex, as the construction of a table for females is, in the case of many of the species, virtually hopeless. We have given, however, under the majority of the species comparative notes which should prove of some value in separating females of the different forms.

The species of this genus inhabit preferably heavy forest, living among the fallen leaves resting on the surface leaf mould, in epiphytic bromeliads and in dead agaves, while *C. landalei* frequents the shelter of banana blossom bracts. *C. delicatula*, however, as one might expect of the most widely distributed member of the genus, is more adaptable than the other forms and also occurs in the open, under rubbish of various kinds in poorly grassed fields. These diminutive insects run about with great speed and take wing readily, though usually flying but short distances.

Key to the West Indian Species of *Cariblatta*, Based on the Features of the Male Sex

1. Pronotum with two longitudinal dark bars diverging caudad. [*Reticulosa* Group.] 2.
   Pronotum without two longitudinal dark bars .... 3.
2. Size smaller (length of tegmen, 8.4–9.7 mm.). Median portion of distal margin of male subgenital plate subtruncate to weakly arcuate. (Jamaica, Porto Rico.) .... *reticulosa* (Walker).
   Size larger (length of tegmen, 10.7–11.4 mm.). Median portion of distal margin of male subgenital plate produced into a thickened rounded labiation. (Jamaica.) .... *nebulicola*, new species.

3. Pronotal pattern of normal intensity consisting of a concentric design of dots and lines, a well-defined median pair of parenthesis-shaped lines, followed caudad by a characteristic group of four or five dots....................4.

Pronotal pattern consisting only of a pair or a few pairs of median well-separated dots or dashes and a less evident, more caudal and closely placed pair of small points. (Pronotum proportionately larger and more ovate-elliptical.) [*Cuprea* Group.]..17.

4. Pronotal pattern made up more largely of dots, which are more truly concentric in disposition, no supra-cervical markings, the pattern not extending cephalad of the disk. Tegmina without dark lineations of any sort. [*Delicatula* Group.]..5.

Pronotal pattern with its elements more lineate than in the alternate category, less concentric and with a distinct longitudinal tendency, supra-cervical markings present and usually pronounced. Tegmina generally with dark lineations present to a variable degree on the anal sulcus and on proximal section of humeral trunk. [*Insularis* Group.]......................10.

5. Subgenital plate of male developed medio-distad into a projecting, compressed, rostrate finger, broader distad than at its base, sharply delimited by folding of the plate from the infra-stylar portions of the same, which, however, are in contact with the median production. (Face with three broad, regularly spaced dark bars.) (Jamaica.)........................*craticula* Hebard.

Subgenital plate of male not compressed rostrate medio-distad, generally produced in some way but never with the projecting rostrate finger found in *craticula*, the production always bordered laterad by emarginations or distinct diastemas...6.

6. Subgenital plate of male with median production of distal margin acute trigonal, laterad flanked by V-shaped emarginations...........................7.

Subgenital plate of male variable, with median production of distal margin usually not projecting distad of infra-stylar portions of plate, separated from same by deep emarginations, the production when trigonal, rounded and not acute, or the plate has little or no median production and the distal margin is arcuate or nearly straight..............................8.

7. Styles of the male subgenital plate of the general type found in most of the species of the genus, without any striking or extraordinary falciform development. (Porto Rico.)..........................*picturata*, new species.

Styles of the male subgenital plate distad markedly specialized, with a highly developed, falciform structure, as long as the remainder of the style and with a corkscrew-like turn. (Hispaniola)........*unguiculata*, new species.

8. Subgenital plate of male with a median finger-like production, which is sharply separated from the lateral portions of the plate by pronounced but narrow U-shaped emarginations, the production not extending distad of the lateral portions of the plate. (Hispaniola.)...... *leucops*, new species.

Subgenital plate of male not as in alternate category, with distinct but truncate median production or distal margin arcuate to varying degrees........9.

9. Subgenital plate of male with a median, projecting, truncate production, this narrow and not broader than long. (Bahamas.)......*glochis*, new species.

Subgenital plate of male very variable, the distal margin rounded trigonal, low and transverse truncate, arcuate or roundly truncate produced, but never as in alternate category. (Cuba, Bahamas, Hispaniola and Jamaica.) *delicatula* (Guérin).

10. Subgenital plate of male with its medio-distal section symmetrically developed; median production, when present, arcuate or transversely truncate, distal section of plate never folded or puckered when seen from venter or in caudal aspect........11.

Subgenital plate of male with its distal section unsymmetrically developed; median production, when present, unsymmetrical or the distal section of the plate as a whole is folded or puckered........13.

11. Median production of distal margin of subgenital plate of male relatively low, transversely subquadrate or arcuato-trigonal. Interspace between eyes of normal width for this sex in genus, no less than occipital depth of eye..12.

Distal margin of subgenital plate very gently arcuate mesad, no distinct median production present, with a pair of elevated rounded subvertical lamellations laterad, these distinctly evident in caudal aspect. Interspace between eyes less than occipital depth of eye. (Jamaica.)..*jamaicensis*, new species.

12. Distal margin of subgenital plate of male between styles transversely subquadrate, infra-stylar emarginations shallow and not marked; venter of plate subdeplanate. Pronotum proportionately shorter, more transverse, more trapezoidal in outline. (Jamaica.)........*cryptobia*, new species.

Distal margin of subgenital plate arcuato-trigonal produced mesad, infra-stylar emarginations extensive; venter of plate markedly elevated into rounded folds cephalad of infra-stylar emarginations. Pronotum proportionately longer, less transverse, more ovate in outline. (Hispaniola.) *islacolonis*, new species.

13. Distal portion of subgenital plate of male not folded or puckered; median production strongly developed, its distal margin obliquely truncate or arcuate. 14.

Distal portion of subgenital plate of male markedly folded or puckered; median production not strongly developed and its distal margin not obliquely truncate or arcuate........16.

14. Interspace between eyes very narrow, not greater than one-half occipital depth of eye. (Pronotum shorter, more transverse, elliptico-trapezoidal. Median process of male subgenital plate prominent, lateral margins of same subparallel, distad obliquely arcuate; styles not balanced in position and unequal in size.) (Porto Rico.)........*stenophrys*, new species.

Interspace between eyes at least as great as occipital depth of eye........15.

15. Pronotum longer, less transverse, more ovate in outline. Median production of male subgenital plate with lateral margins subparallel, distal margin sharply oblique truncate, the sinistral angle very acute; sinistral style slightly more distal in position than dextral one. (Porto Rico.) *plagia*, new species.

Pronotum shorter, more transverse, more elliptico-trapezoid in outline. Median production of male subgenital plate with lateral margins not parallel, distal margin obliquely arcuate, greatest length of production sinistrad; sinistral style markedly more distal in position than dextral one. (Virgin Islands and northern Lesser Antilles.) *antiguensis* Saussure and Zehntner.

16. Distal section of subgenital plate of male with lateral flaps folded mesad, leaving ventro-mesad a transverse subtruncate production, which is not appreciably infolded; within the orifice formed by the three parts may be seen the highly modified and very dissimilar styles, the sinistral being spiniform. Lateral angles of pronotum less evident, more rounded. (Jamaica.) *insularis* (Walker).

Distal section of subgenital plate of male strongly gathered and puckered in three distinct, converging folds, meso-distad the plate is roughly arcuate-emarginate, the flaps laterad of this unsymmetrical and not strongly infolded mesad; styles less highly modified and not markedly dissimilar, basically as in the other species of genus. Lateral angle of pronotum more evident, less rounded. (Jamaica.)................*landalei*, new species.

17. Size smaller (length of tegmen, 9.2–9.9 mm.). Subgenital plate of male symmetrically developed, with a low disto-median production, venter of plate not strongly sculptured; styles equal in development and size. (Jamaica.) *cuprea* Hebard.

Size larger (length of tegmen, 11–11.2 mm.). Subgenital plate of male unsymmetrically developed, with a median U-shaped emargination separating two unequally-sized style-bearing productions, the sinistral far larger than the dextral, venter of plate markedly concave laterad and mesad; styles unequal in development and size. (Jamaica.)......*orestera*, new species.

(The Lesser Antillean *C. punctipennis* Hebard is a member of the *Cuprea* Group, but the male sex is unknown and it is therefore impossible for us to include it in the above key. The dotted tegmina, however, are a distinctive feature not closely approached in any other species of the genus known to us. We have discussed the species in its proper systematic position below.)

The pronotal disk pattern fluctuates in tone and complexity in most of the species in response to the intensification or recession of the pattern as a whole. This affects many of the elements in the disk pattern which may be referred to as unstable, as in the recessive condition they become nearly if not fully obsolete, while the more stable features are merely weakened. In consequence the extreme conditions in material of the same species often will, at first examination, appear quite distinct, but a comparative analysis and homologizing of the features will show the basically essential character of the pattern.

The facial pattern acts in much the same fashion, the more ventral bars even becoming completely obsolete at times, again merely breaking into two or more components. Frequently the bars of an intensive phase break into a series of dots in recessive material of the same species, while in other species what might be called a mean or average color phase, with distinct and complete bars, shows in an intensive phase additional dark-colored infuscations which will unite and obscure bars of the pattern generally distinct.

The fluctuations in facial patterns noted above are not peculiar to the genus *Cariblatta*, as the same tendencies are found in many genera of the Pseudomopinæ possessing complicated facial patterns. It seems advisable, however, to emphasize these tendencies in relation to a genus where they are particularly pronounced.

The group importance given to features of the pronotal pattern in the above key may seem unwarranted at first examination, or even be discounted by our remarks on pattern fluctuation. The facts of the case, however, are that the basic essentials of this pattern, the portions which are virtually unaffected by the pattern recession, are the determiners of the types of pattern used as group features. Only in the cases of the *Delicatula* Group and the *Insularis* Group will sufficient similarity be found to cause any confusion. The difference in pronotal pattern in these two is subtle, but the general tendencies which we have endeavored to express, i. e., a more circular and concentric disposition of spots, with fewer lines, in the *Delicatula* Group, and a more longitudinal disposition of the pattern with more lineate tendencies, and a distinct supra-cervical extension of the pattern in the *Insularis* Group, should be apparent after careful examination.

Cariblatta reticulosa (Walker)

Blatta reticulosa Walker, 1868, 'Catal. Blatt. Brit. Mus.,' p. 103. ♂; Jamaica.

Jamaica.—Liguanea Plain, near Kingston, VII, 5, 1920, (R. and H.; moderately numerous in leaf litter in mangrove swamp), 3 ♂, 6 ♀, 1 immat. ♂, [Hebard Cln. and A. N. S. P.]. Cinchona ["Hill Gardens"]. Blue Mountains, VI, 11 and 14, 1923, (C. C. Gowdey and Mrs. C. C. Gowdey), 2 ♀, [Jam. Dept. of Agr.]. Near Troy, Trelawny Parish, V, 15, 1909, (A. E. Wight), 1♂, [M. C. Z.]. Balaclava, St. Elizabeth Parish, V, 1, 1909, (A. E. Wight; in decaying herbage), 3♂, 2 ♀, [M. C. Z.].

Uvarov has compared material from us with the Walkerian type, and finds our association to be correct.

This beautiful species is known only from Jamaica and Porto Rico. Hebard in his study of the genus[1] reported it from Stony Hill, St. Andrew Parish, Jamaica, and Aibonito, Dept. of Guayama, Porto Rico. The Cinchona individuals have slightly shorter tegmina than any other specimens seen by us, which reduction may possibly be correlated with the relatively elevated station (4900 feet) for this material. There exists, however, a probability the species is a native of the lower levels of the island and that it may have been accidentally introduced at Cinchona.

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[1] 1916, Trans. Amer. Ent. Soc., XLII, p. 158.

The field work of the senior author in 1923 in territory adjacent to Cinchona, and in a variety of conditions, failed to disclose the present species, although three peculiarly montane species of the genus were encountered. This would seem to indicate that the Cinchona occurrence of *reticulosa* may be due to human agencies.

The facial pattern, aside from the interocular bar, varies in reduction of transverse elements, to the point where it is represented solely by paired groups of three trigonal spots near the antennal scrobes.

At Stony Hill *reticulosa* was taken in late October in leaves on humus in hillside forest.

Cariblatta nebulicola,[1] new species

Plate I, Figure 1

Related to *C. reticulosa* Walker, the color pattern being essentially the same, but *nebulicola* is decidedly larger, the bulk being half again as great, the new form also differing in the median portion of the male subgenital plate being produced into a thickened rounded labiation.

Type.—Male; Morces Gap, Blue Mountains, Jamaica. Elevation, 4980 feet. July 30, 1923. (Rehn; in dead leaf litter along trail side in dense windward slope forest.) [Academy of Natural Sciences of Philadelphia, Type No. 5400.]

Size large for genus; form and surface as in *C. reticulosa*. Interspace between eyes at occiput of moderate width, very slightly greater than occipital depth of eye. Palpi more elongate and slender than in *C. reticulosa*, penultimate and antepenultimate joints distinctly more delicate than in the older species. Tegmina slightly more elongate than in *reticulosa*, venation as in *C. reticulosa*.[2] Supra-anal plate moderately transverse, subtrigonal, median portion with margin subtruncate. Subgenital plate transverse, lateral portions of plate moderately upturned; stylar fossæ moderately deep, concave emarginations of distal margin, between which median portion of margin is produced into a rounded, thickened labiate and lappet-like projection, faintly asymmetrical, extent of production beyond fossæ equal to one-third distance between centers of same: styles short, swollen, not reaching as far distad as apex of median projection, distal surface covered with numerous short, almost imbricate teeth.

Allotype.—Female; same data as type. [Acad. of Nat. Sci. Phila.]

Differing from the male in the following noteworthy features.

Interspace between eyes at occiput greater, appreciably surpassing in width the occipital depth of eye. Supra-anal and subgenital plates as in same sex of *reticulosa*.

Coloration.—Color pattern and tones essentially as in *C. reticulosa*[3] with the few exceptions here noted. Dark paired bars of pronotal disk usually not connected meso-caudad, the bars varying somewhat individually in width. Tegmina with anal and discoidal fields suffused with tawny-olive,[4] the normally covered portion of the dextral tegmen broadly washed with mummy brown; anal sulcus occasionally marked in part with mummy brown; mummy brown humeral band usually as extensive as in *reticulosa*, rarely (in type) not reaching as far distad as the apex of the anal field.

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[1] An inhabitant of fog or mist, in allusion to its occurrence at a locality which is rarely free from fog masses.

[2] See Hebard, 1916, Trans. Amer. Entom. Soc., XLII, p. 157.

[3] See Hebard, 1916, Trans. Amer. Entom. Soc., XLII, p. 158.

[4] This area in *reticulosa* was described by Hebard (idem, p. 158) as "suffused with mummy brown," but this is an error, as the color is tawny-olive.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Width of Tegmen
♂, Morces Gap, Jamaica, type........	9.2	2.3	3	11.4	3 mm.
♀, Morces Gap, Jamaica, allotype.....	9.7	2.4	3.2	10.8	3
♀, Morces Gap, Jamaica, paratype...	9	2.2	3.1	10.7	3

The measurements show that but little size variation is present in the series of six adults before us. The color pattern varies but little, this in the extension of the darker markings, particularly the pronotal humeral stripe and the suffusion of the ventral abdominal surface.

The series before us consists of the type, the allotype, four paratypic females bearing the same data, and an immature male taken at the same locality, July 19, 1923, by Rehn and now in the Academy of Natural Sciences of Philadelphia. The adults were all taken from dead leaves banked along the side of the trail in dense forest of tree ferns, *Podocarpus*, *Cyrilla*, and numerous other trees. The immature male was taken from an epiphytic bromeliad. This forest area is bathed in fog a large portion of the time and is quite different in character from that on the leeward side of the Blue Mountains.[1]

Cariblatta craticula Hebard

Cariblatta craticula HEBARD, 1916, Trans. Amer. Entom. Soc., XLII, pp. 152, 156, 163, Pl. XI, figs. 4 and 5, Pl. XII, fig. 9. ♂, ♀; Mayaguez (type locality) and Adjuntas, Porto Rico.

We have no information additional to that contained in the original description.

Craticula clearly represents one extreme of a series of species embracing forms from all the Greater Antilles and the Bahamas, which we are calling the *Delicatula* Group.

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[1] Shreve (Publ. No. 199, Carneg. Inst. of Washington) has studied this region from the standpoint of the plant geographer. The exact locality for the material of *C. nebulicola* is shown in plate six of his interesting contribution.

The peculiarly compressed rostrate median section of the male subgenital plate is the most apparent distinguishing feature of this species. This has been well figured by Hebard.

The species is known only from the western coast and Cordillera Central of Porto Rico.

Cariblatta picturata, new species

Plate I, Figures 2 to 5

Cariblatta punctulata Hebard, 1916, Trans. Amer. Entom. Soc., XLII, p. 158. (In part.) Records from Adjuntas (in part) and Baños de Coamo, Porto Rico.

A member of the *Delicatula* Group, related on one hand to *C. craticula* of the same island (Porto Rico) and on the other to the Hispaniolan *C. unguiculata*. From *craticula*, *picturata* can be distinguished by the less compressed and less rostrate medio-distal section of the male subgenital plate, which has a central trigonal projection well separated from the infra-stylar sections of the plate, the whole lacking the substrangulate condition of the median peg-like protuberance and stylar contiguity of *craticula*. The face lacks the regular transverse dark bars of *craticula*, having instead a rather sparse pattern of dots, mainly grouped laterad. The pronotal pattern is more decided, regular and with more components than in the older known species. *Unguiculata* is compared with the present species below.

Type.—Male; Adjuntas, Department of Aguadilla, Porto Rico. June 8–13, 1915. (F. E. Lutz; beating.) [New York Academy of Sciences; American Museum of Natural History.]

Size, form, and texture of surface as usual in species of this genus.

Head narrowly visible cephalad of pronotum as seen from dorsum. Interspace between eyes faintly greater than occipital depth of eye.

Tegmina surpassing apex of abdomen by one and one-half times the length of pronotum.

Subgenital plate weakly scoop-shaped, with disto-lateral margins obliquely converging to the regions of the stylar bases, where the margin has subrectangulate projections, the surface of the plate there arcuately subinflated; median process of plate separated from the infra-stylar areas by moderately acute, rather narrow emarginations; median process acute, sublinguiform, apex sharp, lateral margins of the process with a weak sinuation. Styles short, with external and dorsal surface having a regular series of recurved unguiform spines, increasing in size distad, the terminal dorsomesad one distinctly larger than the others, but not of exceptional size.

Allotype.—Female; Baños de Coamo, Department of Ponce, Porto Rico. December 27, 1914. (H. E. Crampton; at light.) [New York Academy of Sciences; American Museum of Natural History.]

Differs from the male sex, other than in purely sexual features, in the interspace between eyes being appreciably greater than occipital depth of eye.

General coloration similar to that of most of the other species of the genus. Interocular portion of the occiput with a broad, solid, transverse bar of prout's brown, below which the face is of the same ochraceous-buff as the whole venter, except for the following pattern of prout's brown: a concave transverse series of four dots between the upper margins of the antennal scrobes, the lateral ones connected ventrad with an irregular larger marking; a pair of irregular, oblique infra-antennal bars, each connected mesad with a weak trigonal blotch, these faintly connected by an obscure line across the lower face; an isolated subobsolete U-shaped marking is indicated mesad, below the transverse series of dots and the faint line of the lower face. Occasionally (in paratypic female) this marking develops lateral extensions and becomes connected with the lateral ones of the above-mentioned transverse series of dots. Eyes hazel. Pronotum with disk having the base color ochraceous-buff; dark pattern marked, prout's brown, made up of dots and lines, with the usual meso-caudal groups of five dots well indicated, the median pair of arcuate lines equally prominent, no markings reaching cephalic margin of the pronotum, or in fact extending beyond the area of the disk strictly speaking; latero-cephalic sections of disk pattern consisting of obliquely and sinuously disposed dots, lines and ocelli as figured (Pl. I, fig. 2). Venter of the abdomen with a broad median bar of prout's brown, narrowing distad, not involving the subgenital plate; laterad the same segments each bear a single circular dot of the same color; intimations of narrow lateral intermarginal dark bars are also seen.

MEASUREMENTS

	Length of Body	Length of Pronotum	Width of Pronotum	Length of Tegmen	Width of Tegmen
♂, Aibonito, Porto Rico, type	7.1	1.6	2.4	8	2.4mm.
♂, Baños de Coamo, Porto Rico, paratype.	8.3	1.5	2.3	7.2	2.2
♀, Baños de Coamo, Porto Rico, allotype	7	1.6	2.5	8	2.2
♀, Baños de Coamo, Porto Rico, paratype.	7.8	1.7	2.5	7.5	2.3

In addition to the type and allotype we have before us a paratypic male and a paratypic female, from the same locality as the allotype (Baños de Coamo), one taken the same date, the other in September, 1915. The specimens show no noteworthy features of difference.

The species may be limited in distribution to the more elevated central portions of the island of Porto Rico.

Cariblatta unguiculata, new species

Plate I, Figure 6

Cariblatta punctulata HEBARD, 1916, Trans. Amer. Entom. Soc., XLII, p. 158. (In part.) Portion of series from San Francisco Mountains, Dominican Republic.[1]

Identical in general form, character and coloration with *C. picturata* except for the highly specialized character of the styles of the male subgenital plate, and some details of the facial and abdominal pattern, which latter, however, additional material may show not to be diagnostic.

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[1] The specimen on which this species is based is the one mentioned by Hebard (Trans. Amer. Entom. Soc., XLII, p. 160) in his footnote fifteen.

TYPE.—Male; San Francisco Mountains,[1] Province of Santo Domingo, Dominican Republic, Hispaniola. September, 1905. (August Busck.) [United States National Museum.]

Size, form and coloration as in *C. picturata*. Subgenital plate except for styles identical with that of *picturata*. Styles basally as in *picturata*, but terminal recurved unguiform spines enormously enlarged, very heavy, strongly recurved and directed mesad, forming half a circle and with their peripheral surface bearing several dentate serrations. The general form of the styles is so changed from that found in *picturata* that the impression of the first turn of a corkscrew is given.

The face bears a transverse narrow prout's brown bar between the dorsal sections of the antennal scrobes, which, however, are not involved; an obliquely directed spot of similar color adjacent to the internal margin of the scrobes; lateral infra-antennal larger blotches of the same, and a concave transverse lineation ventrad on the face, this with coalesced paired triangular blotches extending ventro-laterad to the base of the mandibles. The venter of the abdomen has a broad medio-longitudinal mummy brown bar and less clearly defined dark lateral bars, which latter are broken by a creamy white dot on each segment as well as a similar marginal edging; the dark areas reach but do not heavily involve the subgenital plate.

Length of body, 7.2 mm.; length of pronotum, 1.7; greatest width of pronotum, 2.4; length of tegmen, 8.2; greatest width of tegmen, 2.5.

The type of this extraordinarily specialized species is unique. Of the numerous specimens from this locality we find but one male with this remarkable stylar development, and it is not possible to associate any of the females from the San Francisco Mountains with it by color or other ambisexual features. The species may be restricted to the region of the Dominican "Cordillera Central," but its fundamentally close relationship with *C. picturata* of the similarly elevated central portion of Porto Rico is clearly evident, and their common origin cannot be questioned.

Cariblatta glochis,[2] new species

Plate I, Figure 7

Related to *C. picturata* and *unguiculata*, here described, but differing chiefly in the more produced, truncate character of the median process of the male subgenital plate, on each side of which the margin is more broadly and deeply arcuate-emarginate.

The relationship with *C. delicatula* and its allies (*C. leucops* and *lutea*) is even closer, but the form of the subgenital plate of the male is sufficiently different to identify the present species, which also lacks a medio-longitudinal dark line on the venter of the abdomen.

TYPE.—Male; Mangrove Cay, Andros Island, Bahamas, May-June, 1917. (William M. Mann.) [American Museum of Natural History.]

The characters here given are those of appreciable difference from the descriptions of *C. picturata* and *C. unguiculata*.

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[1] For notes on this locality see page 11, footnote 1.

[2] From *γλωχίs*, the end of the yoke-strap, in allusion to the shape of the median section of the subgenital plate of the male.

Size somewhat smaller; form similar. Interspace between eyes of medium width, slightly greater than in *C. picturata*, appreciably exceeding the occipital depth of eye. Subgenital plate with medio-distal projection subquadrate, distal margin subtruncate, lateral margining diastemas between the projection and the styles relatively broad, regularly concave; infra-stylar portions of the plate obtusely produced, not prominent; styles much as in *picturata* but claw-like spines distinctly larger.

Color pattern as in *C. picturata*, but face ventrad of the occipital interocular bar uniformly pale buffy without dark markings of any sort. Venter of abdomen pale buffy, laterad with weak and cloudy longitudinal intermarginal bars of prout's brown, which are largely but a suffusion, although deeply colored on the circular areas of usual indication.

Length of body, 6.5 mm.; length of pronotum, 1.5; greatest width of pronotum, 2.2; length of tegmen, 7.1; greatest width of tegmen, 2.

The type of this species is unique. The exact systematic position of the species is rather difficult to determine. On one hand it has marked affinity with *picturata* and *unguiculata*, on the other with *delicatula*, *leucops*, *lutea* and related species. It would seem the more warranted course to consider it an off-shoot of the *delicatula* complex showing, however, pronounced tendencies toward the assemblage comprising *picturata* and *unguiculata*.

Cariblatta leucops,[1] new species

Plate I, Figure 8

While having in its genital features a decided suggestion of *C. craticula*, the present species is a close relative of *C. glochis* on one hand and *delicatula* on the other, having a generally similar coloration and fundamentally the same type of male subgenital plate. The resemblance of this plate to that of *C. craticula* we consider one of analogy, and not expressive of close relationship. From *glochis*, *leucops* may be separated by the larger size, somewhat narrower interocular space, and the less produced, narrower median projection of the male subgenital plate, which also has much smaller marginal concavities and smaller styles. From *delicatula* the present species differs markedly in the more compressed subgenital plate of the male, with its quite different median process and far narrower emarginations laterad of the same, as well as the narrower eye interspace.

TYPE.—Male; Port-au-Prince, Haiti, Hispaniola. 1910. (G. Lion.) [Hebard Collection, Type No. 959.]

Size medium (for genus); form as usual.

Interspace between eyes moderately broad, subequal to occipital depth of eye.

Pronotal form, tegminal type and proportions as usual in the genus.

Subgenital plate weakly scoop-shaped; median process of distal margin small, rounded styliform, slightly narrowing distad, well rounded at apex; margining concavities flanking the median section narrow, moderately deep, the infra-stylar portions of the plate reaching distad as far as the apex of the median process, in general rectangulate, distal margin of these sections weakly arcuate, surface of the infra-stylar sections arcuate in transverse section: styles short, with recurved, claw-like spines short, directed mesad, closely adpressed, the terminal one distinctly heavier and longer than the others.

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[1] In allusion to the whitish, unmarked face.

ALLOTYPE.—Female; same data as type. [Hebard Collection.]

Agreeing with the male in all ambisexual features, the only noteworthy structural feature being that the interspace between the eyes is broader than in the male, and slightly greater than occipital depth of eye. Genitalia showing no distinctive features.

Interocular dark bar broad, solid, prout's brown, sharply defined ventro-cephalad; face uniformly pale ochraceous-buff, rarely (in the type male) with a poorly defined dark pattern consisting of a pair of contiguous triangular markings, situated inter-antennally, and two indefinite transverse dark bands situated ventrad on the face.[1] Eyes mars brown. Pronotal pattern strongly marked, regular, of the type usual in this group of the genus. Venter of the abdomen pale with longitudinal marginal bars and a narrower median dark bar, all of these reaching to but not involving the subgenital plate. In the type these bars are broader than in the others, the lateral ones solid and single, while in the other specimens the median bar is narrower and the lateral ones break longitudinally into two parallel series separated by a pale inter-space. Cerci largely suffused with mummy brown, the venter almost solidly so, the dorsal surface with a proximal and a predistal wash of the dark color.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Port-au-Prince, type	7	1.7	[2]	7.4	2.1 mm.
♂, La Moriniere, paratype............	6.8	1.7	2.7	8.2	2.2
♀, Port-au-Prince, allotype............	7.5	1.7	2.7	7.9	2.3

In addition to the type and allotype we have before us a single male paratype from La Moriniere, Haiti, elevation about 125 feet, taken March 1 to 5, 1922, (F. E. Watson), and from the collection of The American Museum of Natural History.

Cariblatta delicatula (Guérin)

Blatta punctulata BEAUVOIS, 1805, 'Ins. Rec. Afr. et Amér.,' p. 184, Pl. *ib*, fig. 8. San Domingo. (Not *Blatta punctulata* Gmelin, 1790.[3])

Blatta (*Phyllodromia*) *delicatula* GUÉRIN, 1857, in La Sagra, 'Hist. Phys. Polit. et Nat. Île de Cuba, Ins.,' p. 346. Cuba.

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[1] The possession of this pattern is a feature which is rather mystifying, as it is not at all indicated in the allotype or the paratypic male. The pale portions of the face in the type are just as strikingly contrasted as in the other material of the species.

[2] One side of pronotal margin is broken, so the width cannot be accurately measured.

[3] 1790, 'Syst. Nat.,' I, part 4, p. 2047. See Hopkinson, 1907, Proc. Zoöl. Soc. London, pp. 1035–1037, for dates of Gmelin's work.

Cariblatta punctulata Hebard, 1916, Trans. Amer. Entom. Soc., XLII, p. 158. (In part.) Records from Nassau, Bahamas; Cabañas in Pinar del Rio, Pinar del Rio, Cabana in Havana Province, Jesús del Monte, and Cayamas, Cuba; Little Cayman Island; San Lorenzo (in part), San Francisco Mountains (in part) and Sanchez, Dominican Republic, Hispaniola; Montego Bay (in part) and Rio Cobre, Jamaica.

It is most unfortunate to be compelled to discard Beauvois' earlier *punctulata* for the much later *delicatula* Guérin, but it is unavoidable on account of the preoccupation by Gmelin's name.

Hebard already has discussed[1] the variations of this rather widely distributed and plastic species. Unfortunately he was misled by the wide range of variation actually present in the species and included, with material properly belonging to this form, other individuals representing quite distinct and undescribed species. We have very carefully and fully re-examined the whole situation, with the material examined in 1916 and much additional before us.

Summarizing the localities previously reported by Hebard and adding the data for the additional material, we have examined the following (giving full data only for additional material).

Bahamas.—"Bahama Islands," II, 11, 1905, 1♂, 1♀, [Hebard Cln. and U. S. N. M.]. Andros Island, 1920, (W. M. Mann), 1♂, 1♀, [U. S. N. M.]. Fresh Creek, Andros Island, V-VI, 1917, (W. M. Mann), 1♀. Mangrove Cay, Andros Island, V–VI, 1917, (W. M. Mann), 1♀. Nassau, New Providence Island.

Cuba.—Pinar del Rio, Pinar del Rio Province. Baños de San Vincente, seven kilometers north of Viñales, Pinar del Rio Province, IX, 16–22, 1913, (Leng; on banana), 1 immature ♀. Cabañas, Pinar del Rio Province. Jesús del Monte, Havana Province. Cabana, Havana, Havana Province. Comoa, Havana Province, X, 1918, (J. Cabrera), 1♀, [A. N. S. P.]. Soledad, ten miles west of Cienfuegos, Santa Clara Province, VI, 5, 1918, (Barnum Brown), 1♂, 1♀. Cayamas, Oriente Province.

Jamaica.—Montego Bay, St. James Parish. Balaclava, St. Elizabeth Parish, III, 23–IV, 15, 1909, (A. E. Wight), 1♂, 1♀, [M. C. Z.]. Rio Cobre, near Bogwalk, St. Catherine Parish.

Hispaniola.—Sanchez, Province of Samaná, Dominican Republic. San Lorenzo, Province of Samaná, Dominican Republic.[2] San Francisco Mountains, thirteen kilometers north of San Cristobal, Province of Santo

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[1] 1916, Trans. Amer. Entom. Soc., XLII, pp. 158–163, Pl. xi, figs. 2 and 3, xii, figs. 4–8, xiii, figs. 1 and 2.

[2] The locality refers to a settlement on the San Lorenzo River, which empties in San Lorenzo Bay on the south shore of Samaná Bay, southeast of and across that body of water from the port of Sanchez.

Domingo. Blanton Mine, north of San Cristobal, Dominican Republic, VII, 26, 1917, (Harold Morrison), 4♂, [U. S. N. M. and A. N. S. P.].

Little Cayman Island.—No more exact locality.

We have tabulated and by carefully made sketches analyzed the extent of variation present in this species. It is clearly the most variable in the genus, and an appreciation of its variations suggests a possible explanation of the lines along which these variations have developed.

The subgenital plate of the male sex is, in this genus, probably the most important specific differential feature. In the other species of the genus the form of this plate has quite fixed and definite values, but in the present one very marked variation occurs in the shape and production of the median portion of the distal margin of the plate. The series before us is sufficiently extensive to enable us to feel confident of the specific identity of the extremes of form of this area, in material here considered as conspecific. In one extreme the interstylar portion of the distal margin of the plate is straight, or even very faintly concave, from which type it becomes increasingly convex-arcuate, until it is quite strongly so. From this type we find two tendencies evident: one, examplified by a triangular (virtually equilateral) modification of the production, which is rare (Jesús del Monte, Cuba, one male only); the other a quadration of the same area, usually only by truncation of the most produced portion of the plate and thus the form is transversely rectangulate, or by a narrowing of the production as well as its distal truncation, the result being approximately subequal length and width. The latter condition has a marked suggestion of that found in *C. glochis*, and also occurs in the same general region as the latter species (Bahamas), but fundamentally the two appear to us to be well and specifically distinct, although the evolutionary development of *glochis* may be indicated by this tendency. Occasionally the tendency toward quadration is not fully symmetrical (one male from Montego Bay, Jamaica). We have before us sufficient connected and transitional evidence to fully convince us of the specific identity of these types, the extremes of which would appear distinct if alone compared.

Taking the variational evidence of the form of the distal margin of the male subgenital plate and geographically considering it, we find what might be called the more generalized type; i. e., that from a straight margin to one with a moderate arcuation,[1] found in Hispaniola, to the exclusion of any other tendency. Eastern Cuba (Cayamas) has the similar arcuate type with the truncate type also appearing; western Cuba has well arcuate (Cabana, Havana) and the distinctly triangular

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[1] As figured by Hebard, 1916, Trans. Amer. Ent. Soc., XLII, Pl. xi, fig. 2.

(Jesús del Monte) types. The Bahamas have the truncate tendency indicated, one from Andros having the extreme equally long and broad phase mentioned above. Jamaica has diverse tendencies, and virtually all are seen from one locality (Montego Bay), ranging from a well arcuate form through an arcuato-subquadrate type to a pronouncedly transverse quadrate one.

It appears to us from the foregoing that Hispaniola was probably the distributional center of the species, which there would seem to have greatest stability in this structural feature, which is of such great specific differential importance in the other forms of the genus.

From the Hispaniolan center toward the periphery of the species distribution, at least on the west and northwest, the lines of distribution exhibit marked and progressive instability in the form of this plate, eastern Cuba closely approximating Hispaniolan material in this respect, while western Cuba has what might be called marked divergence. Eastern Cuba has one variant which suggests quadrate condition best indicated in Jamaica, where we find arcuate and marked quadration occurring in the most confusing medley. The Bahamas have the quadrate tendency alone indicated and in a variable degree.

The interocular width is moderately variable, even in series from the same localities, but not to the extent of causing confusion with the other species characterized by extreme reduction of this interspace.

The color pattern has marked intensive and recessive extremes, in the latter of which the face bears no dark markings, while the pattern of the pronotal disk is very greatly reduced and consists at most of but a relatively few scattered dots.[1] In the intensive extreme the face bears a very complicated dark pattern, made up of generally transverse markings, the dorsal pair of which form large irregularly shaped blotches. Occasionally the transverse character of the facial pattern is obscured and we have two longitudinal series of dots, which, however, show evidence of their underlying transverse factor by the regularity of the paired transverse position, the longitudinal disposition usually to some degree arcuate. The intensive pronotal pattern represents about the maximum development of this found in the present group, and has been well figured by Hebard from a Hispaniolan male.[2]

Geographically the Hispaniolan material is in general distinctly intensive and none before us from the island are recessive in pattern. This is particularly true of the pronotal pattern.

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[1] See Hebard, 1916, Trans. Amer. Ent. Soc., XLII, Pl. xii, fig. 7.
[2] 1916, *vide supra*, Pl. xii, fig. 6.

Cuban material ranges in pattern tone from one extreme (recessive)[1] to a moderately intensive type, while the few Bahaman individuals show an equally wide variational range. Montego Bay, Jamaica specimens show a wide range of variation in depth of pronotal pattern, but the face rarely has any dark markings.

It would seem that facial markings and a marked dark pronotal pattern are not always correlated, also that geographically little correlation of the intensity of the pronotal pattern is possible, and the same is almost as true of the facial markings.

The species occurs on at least the Dominican portion of the island of Hispaniola, probably all of Jamaica, eastern and western Cuba and at least certain of the western Bahamas (Andros and New Providence). It will probably be found more widely distributed on the Bahamas and also in other parts of Hispaniola. It does not occur in Porto Rico, as far as we know, the previous records from that island referring to other species and here corrected. Its occurrence on Little Cayman Island may be due to introduction from Jamaica.

Cariblatta lutea minima Hebard

Cariblatta lutea minima Hebard, 1916, Trans. Amer. Entom. Soc., XLII, p. 170, Pl. XIII, fig. 4. ♂, ♀; Punta Gorda, Fort Myers, Citrus Center, South Bay of Lake Okeechobee, Marco, Everglade, Chokoloskee, Miami (type locality), Virginia Key, Homestead, Key Largo, Long Key and Key West, Florida.

Cuba.—Baños de San Vincente, Pinar del Rio Province. Cojimar, Havana Province, VIII, 21, 1918, (J. Cabrera; near sea-shore), 1♂, [A. N. S. P.].

Hebard[2] recorded the female specimen from Baños de San Vincente as *C. lutea lutea*, on account of its relatively long tegmina, but the wings in this specimen, as mentioned by him in footnote 27 on page 167 of the same paper, are greatly reduced and vestigial. The male before us from Cojimar is perfectly typical of *lutea minima* and demonstrates clearly the Baños de San Vincente female represents a long-tegmined individual of the same subspecies, and not the more fully winged *C. lutea lutea* of northern Florida and the adjacent regions.

This subspecies is known only from central and southern Florida and the two localities in Cuba here listed. Relative to the occurrence of this Floridian type in Cuba, see our remarks under *Latiblattella rehni* and *Plectoptera poeyi*, which are parallel cases.

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[1] As well figured by Hebard, 1916, *vide supra*, Pl. XII, fig. 7.

[2] 1916, Trans. Amer. Ent. Soc., XLII, p. 170.

Cariblatta cuprea Hebard

Cariblatta cuprea HEBARD, 1916, Trans. Amer. Entom. Soc., XLII, pp. 153, 156, 172, Pl. XI, figs. 6 and 7, Pl. XII, fig. 10. ♂, ♀; Stony Hill, Jamaica.

JAMAICA.—Long Pond,[1] Trelawny Parish, II, 20, 1921, (C. C. Gowdey), 1 ♂, [Jam. Dept. Agr.]. Cumberland District, Clarendon Parish, elev. about 3000 feet, XII, 15–18, 1919, (F. E. Watson), 1 immat. ♀. Port Antonio, Portland Parish, V, 16–26, 1906, (A. E. Wight), 2 ♀, [M. C. Z.]. Near Bog River, Port Antonio, Portland Parish, III, 31 and IV, 10, (A. E. Wight; night), 1♂, 1♀, [M. C. Z.].

An examination of the typical series from Stony Hill, as well as the material here reported, shows no appreciable variation in the pronotal pattern, although the face in two individuals is without the two ventral dark bars originally described. These specimens are both males, one from Stony Hill, the other being the Long Pond specimen reported above. These bars are also subobsolete in one male and two females from Stony Hill. A third interocellar bar is present in a male from the type locality, and is intimated in a female from the same place.

The interstylar portion of the margin of the male subgenital plate is generally as figured by Hebard,[2] although the Long Pond male shows that variation in the form of this area does occur, the arcuation there present being distinctly more marked than in the other males, and with a trigonal tendency.

This species is one very easily recognized by the combination of stouter form, reduced pronotal pattern, and general type of the male subgenital plate.

We have no information on the habits of the species to add to Hebard's original notes.

Cariblatta orestera,[3] new species

Plate I, Figures 9 to 11

A most interesting member of the *Cuprea* Group, showing clearly in its pronotal form and pattern its close relationship to *cuprea*, but in the structure of the male subgenital plate widely different, and there showing similarity to the South American *C. fossicauda* and *igarapensis* of the *Fossicauda* Group. The form of the male subgenital plate is so distinctive in the latter group that *orestera* would at once be associated with *fossicauda* and *igarapensis*, if the pronotal form did not to our minds so definitely indicate the true relationship. In a linear arrangement it seems necessary to place the *Fossicauda* Group in the general vicinity of the *Cuprea* Group, as in *orestera* we find evidence of similarity or parallelism in the development of the genitalia, although true relationship may not actually exist. The relative weight to be given to the two sets of features, i.e., (1) pronotal form and basic pattern of same, and (2) general type and structure of the male subgenital plate, is a matter of personal equation, but with genitalic features as diverse as they are in this genus, and pronotal features basically as uniform within groups as they appear to be, it would seem more logical to stress the latter set of characters. Added force is given to this course of action by the fully warranted assumption that the endemic *Cuprea* Group has developed a specialized montane form, rather than that the South American *Fossicauda* Group has developed in Jamaica a form having a pronotal type similar to the peculiarly West Indian *Cuprea* Group. The species is probably in size the largest member of the genus.

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[1] A sugar estate on the north shore of the island about six miles from the sea. (C. C. Gowdey.)
[2] *Vide supra*, Pl. XI, fig. 6.
[3] From ὀρέστερα, dwelling in the mountains, in allusion to its habitat.

Type.—Male; between Pleasant Hill and St. Helens Gap, Blue Mountains, Jamaica. Elevation, 4400 to 4700 feet. July 22, 1923. (Rehn; shaken from head of wild ginger (*Renealmia* sp.) in mountain forest.) [Academy of Natural Sciences of Philadelphia, Type No. 5407.]

Size large (for the genus); form relatively broad for the genus, much as in *C. cuprea.*

Head with occipital interspace between eyes distinctly broader (one-fourth in type) than occipital depth of eye. Palpi with their proportions somewhat different from those of *C. cuprea,* less slender; penultimate joint but very slightly longer than ultimate joint, instead of about two-fifths longer as in *cuprea;* ultimate joint appreciably broader and less compressed as seen from dorsum than in *C. cuprea.*

Pronotum with its general form as in *C. cuprea.*

Tegmina and wings surpassing apex of abdomen by about length of pronotum, general form and venation as in *C. cuprea.*

Subgenital plate moderately produced, subtrigonal, appreciably asymmetrical: sinistral side with margin oblique, in proximal two-thirds weakly convex, with highest section of arcuation somewhat flattened; dextral side with margin oblique, shorter than sinistral side, weakly convex proximad; medio-distal portion of margin conspicuously U-emarginate; sinistral stylar peduncle large, much exceeding in size and projection caudad the dextral stylar one, relatively broad; dextral stylar peduncle little extended and forming a broad receptacle for the style: surface of plate with marked and elevated, but rounded, ridges extending proximad from stylar peduncles, diverging, becoming subobsolete proximad, surface between and laterad of these ridges concave, more decidedly so on lateral sections: sinistral style but little apparent, largely hidden in pocket of dorsal surface of sinistral stylar peduncle, visible surface heavily spinulose; dextral style relatively large, short and broad, fully exposed when seen from venter, free margin transversely convex and supplied with mesad directed spines, except on internal face. Cerci elongate, subequal to greatest length of subgenital plate, tapering moniliform, apex very slender and acuminate.

Allotype.—Female; same locality as type. Elevation 4650 feet. July 24, 1923. (Rehn; from epiphytic bromeliads.) [Academy of Natural Sciences of Philadelphia.]

The following features are those of noteworthy difference from the male sex.

Occipital interspace between eyes very faintly broader than in male.

Subgenital plate moderately produced, in general form subtrigonal, narrowly scoop-shaped distad; lateral margins regularly converging, faintly arcuate proximad, very weakly and broadly concavo-emarginate in subcercal region, thence nearly straight to the rather narrow and rounded apex, which has an almost imperceptible median concavity. Cerci faintly shorter than greatest length of subgenital plate.

General coloration ochraceous-buff, lateral portions of pronotum and marginal and greater portion of scapular field of tegmina clear hyaline. Head with interocular bar prout's brown, sharply defined ventrad, less so dorsad, ventral margin broadly obtuse-angulate: dark face pattern with as much as three transverse, rather narrow bars, one interocellar and straight, one between ventral margins of antennal scrobes and nearly straight, the third below this and arcuate; the first is indicated in all the material seen, the second is evident or indicated by dots in all, while the third is found in but a single specimen. Eyes mars brown to fuscous. Pronotal disk much as in *C. cuprea*, a pair of dark dots near the middle and with intimations of a fine dark pencilling outlining the disk, paired supra-cervical lines and a "ghost" pattern of curved lines, all of which are variable in intensity and emphasis. Tegmina with no dark markings. Venter of abdomen with pronounced dark markings in but a single individual (the intensive female showing a third dark facial bar), which has a solid, broad, medio-longitudinal mummy brown bar reaching to the base of the subgenital plate, and lateral cloudings of prout's brown, which involve a portion of the margin on each segment.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Type	10	2.5	3.5	11	3.1 mm.
♀, Allotype	10.3	2.5	3.6	11	3.2
♀, Paratype	11.7	2.7	3.7	11.2	3.3

In addition to the type and allotype we have before us three paratypic females bearing the same data as the allotype. These show some variation in size, as witnessed by the measurements given above, and also some in coloration, the range of which is covered in the color description.

All the material of this species was taken in the higher forested country of the Blue Mountains of Jamaica, either shaken from the pale orange-yellow flowers of wild ginger (*Renealmia*) along one of the shaded trails, or taken from a group of epiphytic bromeliads growing on several trees at 4650 feet, near a trail and somewhat away from dense forest.

Cariblatta punctipennis Hebard

Cariblatta punctipennis HEBARD, 1916, Trans. Amer. Entom. Soc., XLII, pp. 156, 173, Pl. XII, figs. 11–18. ♀; Long Ditton and Laudet, Dominica; Barbados (type locality).

This imperfectly known species is clearly a close relative of *C. cuprea* and *C. orestera*, having the same general pronotal form and essentially the same pronotal pattern. Unfortunately the male sex is not known, but the marked brownish punctulæ on the tegmina are distinctive features. The species is well removed from *C. cuprea*, but we have no information regarding its features to supplement that contained in the original description.

Probably this species is limited in distribution to the more southern of the Lesser Antilles and is the one examined by Brunner[1] when he recorded *delicatula* from Grenada and St. Vincent.

Cariblatta cryptobia,[2] new species

Plate I, Figures 12 to 14

Cariblatta punctulata Hebard, 1916, Trans. Amer. Entom. Soc., XLII, p. 158. (In part.) Stony Hill, St. Andrew Parish, Jamaica.

A member of the *Insularis* Group, and forming with *C. islacolonis* and *plagia*, here described, a subgroup having a distinct uniformity in general form and pronotal pattern, but differing in genital and other features. From the species of the preceding *Cuprea* Group, i.e., *cuprea*, *orestera* and *punctipennis*, all three species mentioned above differ in the more slender form, smaller and trapezoidal form of the pronotum, as well as its pattern, and more elongate and differently patterned tegmina with a narrower marginal field. The male subgenital plate of *cryptobia*, however, is very similar to that of *cuprea*, while this area is appreciably different from that of *islacolonis* and very markedly distinct from the type found in *C. plagia*. Comparisons with these species are given under their respective diagnoses. The affinity of these three species with *insularis* and its closer relatives is evidenced, however, by the peculiarities of the pronotal pattern shared by these species, as well as the tegminal pattern and elements of that of the face and interocular region.

Type.—Male; Stony Hill, St. Andrew Parish, Jamaica. October 25, 1913. (Morgan Hebard.) [Hebard Collection, Type No. 960.]

Size relatively small: form slender.

Interspace between eyes of medium width, subequal to occipital depth of eye.

Pronotum in outline subtrapezoidal, greatest width distinctly caudad of the middle; lateral margins distinctly oblique-arcuate from point of greatest width cephalad, regularly passing into cephalic margin, which is appreciably arcuate and in width no greater than one-third of greatest width of pronotum; caudal margin weakly arcuate; lateral sections of pronotum distinctly declivent.

Tegmina lanceolate, surpassing apex of abdomen by faintly more than length of pronotum, moderately subequal in width, apex narrowly rounded; marginal field narrow, distinctly narrower than in *C. cuprea*.

Subgenital plate with interstylar portion of margin weakly produced into a low, transversely subquadrate extension, which is reflexed dorsad and has its actual margin weakly convex arcuate; portion of distal margin dextrad of dextral style faintly arcuate, portion sinistrad of sinistral style obliquely subtruncate. Styles virtually as in *C. cuprea*.

Allotype.—Female; same data as type. [Hebard Collection.]

Differing from the description of the type in the following features.

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[1] 1892, Proc. Zoöl. Soc. London, p. 202; 1893, idem, p. 602.

[2] From κρυπτός, hidden, βίος, life, i.e., a liver of the hidden life.

Form slightly more robust. Interspace between eyes equal to one and one-third times the occipital depth of eye. Tegmina surpassing apex of abdomen by about length of pronotum. Subgenital plate of type usual in genus, subcompressed distad, scoop-shaped; medio-distal section of margin narrowly subtruncate as seen from venter, laterad of this obliquely concave in infra-stylar regions, thence obliquely subtruncate.

General color ochraceous-buff, the pronotal pattern and head and tegminal markings prout's brown to mummy brown. Head of general color, with a broad, dark interocular bar, which has its ventral margin concave or obtuse-angulate emarginate: the face bears three groups of transverse dark markings; the first, which is interocellar, straight or weakly arcuate, broken mesad into paired lateral sections; the second interantennal, weaker and occasionally broken and subnebulose, arcuate; the third distinctly ventral in position, weaker than the others, subnebulose, incomplete laterad and generally broken mesad, so that it is usually made up of two maculations, which are arcuate in disposition. Eyes chestnut-brown. Pronotal disk pattern of the type found in most of the species of this group, and the *Insularis* and *Fossicauda* Groups, consisting of elements similar to those found in the *Punctulata* Group, but more lineate and less punctate, with a pair of additional supra-cervical borderings which reach the cephalic margin of the pronotum (Plate I, fig. 13): lateral portion of pronotum largely clear hyaline. Tegmina with a dark pattern of two arcuate dashes, one on the proximal half of the anal sulcus, the other shorter and often weaker, placed on the discoidal vein at point of divergence of this vein and the median vein, rarely the latter marking is obsolete. This tegminal pattern is the same as that figured by Hebard for *insularis*,[1] while the pronotal pattern is basically as in the latter species.[2] Venter of abdomen with one median and broken lateral dark bars, reaching and joining on the subgenital plate, the lateral bars occasionally obsolete except for the dark stigmatic spots, but in the more intensively colored individuals the lateral bars are broad clouded areas, not sharply defined mesad and with enclosed pale dots on each side of the stigmatic spots, limited laterad by an oblique, sharply defining pale lateral edging on each segment. Limbs pale with dark ventral femoral lineations and vicinity of the tibial spines similarly infuscate.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Stony Hill, Jamaica, type	6.7	1.6	2.4	8	2.3 mm.
♀, Stony Hill, Jamaica, allotype	8.2	1.7	2.7	8.2	2.3
♀, Stony Hill, Jamaica, paratype	7.4	1.7	2.6	8.2	2.3
♀, Stony Hill, Jamaica, paratype	8	1.7	2.6	8	2.3
♀, Mandeville, Jamaica, paratype	7.4	1.9	2.7	8.2	2.3

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[1] 1916, Trans. Amer. Entom. Soc., XLII, Pl. XII, fig. 16.
[2] Idem, Pl. XII, fig. 15.

In addition to the type and allotype we have before us two paratypic females bearing the same data as the type and allotype, and a paratypic female from Mandeville, Manchester Parish, Jamaica, elevation about 2250 feet, November 26–28, 1919, (F. E. Watson; at light), from the collection of The American Museum of Natural History. The material shows that the species is quite uniform in size and the color variation is relatively little for species of this genus. Having but a single male we are unable to say whether any variation occurs in the male genitalia.

Cariblatta islacolonis,[1] new species

Plate I, Figures 15 to 17

Cariblatta punctulata HEBARD, 1916, Trans. Amer. Entom. Soc., XLII, p. 158. (In part.) In part series from San Francisco Mountains and San Lorenzo, Dominican Republic, Hispaniola.

This species is closely related to *C. cryptobia* from Jamaica, described above, agreeing in general form, size, shape of tegmina and pattern of pronotum and tegmina, but differing chiefly in the proportionately longer pronotum, in the ventral margin of the dark interocular bar having two angulate extensions, instead of being concave or angulate-emarginate as in *C. cryptobia*, and in the different structure of the male subgenital plate, which has the styles very characteristically inserted.

TYPE.—Male; San Lorenzo, Province of Samaná,[2] Dominican Republic, Hispaniola. June 27–29, 1915. (F. E. Watson.) [American Museum of Natural History.]

Differing from the description of *C. cryptobia* in the following features.

Interspace between eyes relatively broad, equal to one and one-fourth times the occipital depth of eye.

Pronotum with its breadth less in proportion to its length than in *C. cryptobia*, the greatest width but one and two-fifth times the greatest length, ovate-trapezoidal, point of greatest width but slightly caudad of middle: cephalic margin moderately arcuate, passing regularly into the arcuately obtuse-angulate lateral margins; caudal margin arcuate to the same degree as the cephalic margin, passing by narrowly rounded obtuse-angulations into the lateral margins.

Subgenital plate with its surface distad longitudinally biundulate, being elevated into arcuate folds laterad of a medio-distal depressed section: distal margin produced mesad into a roundly obtuse projection, laterad of which, and at the extremity of the arcuate folds, the margin is weakly concave, thence passing from the distal to the lateral margins by obtuse angulations. Styles inserted on each side of median production of distal margin of subgenital plate, disposed transversely and free extremities directed laterad, distal region and adjacent dorsal surface of styles covered with recurved spiniform teeth.

Coloration as in *C. cryptobia* except for the following. Head with interocular dark bar having its ventrad margin biangulate, dorsal margin irregular and with a pair of narrow extensions indicated mesad: face with dark pattern in general resembling that of *C. cryptobia*, but heavier, the interocellar bar heavier, its dorsal margin dentate, and connected laterad with the second bar, which is heavier laterad and crudely brace-shaped, the third laterad broadly marked ventrad of the antennal scrobes, thence arcuate across the face, heavy, narrowed mesad; lower border of face with several infuscate dots. Pronotum disk pattern similar to that of *cryptobia*, but more finely marked (type) or some of the elements very weakly indicated (paratype).

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[1] In allusion to the association of Columbus with the island of Hispaniola.
[2] See footnote 2, page 26.

Venter of abdomen pale, occasionally with very weak indications of a pair of darker median bars; laterad the only dark markings are the stigmatic spots.

Measurements

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, San Lorenzo, Dominican Republic, type................	7.1	1.6	2.3	8	2.1 mm.
♂, San Francisco Mountains, Dominican Republic, paratype...............	7.6	1.7	2.5	8.5	2.1

In addition to the type we have before us a single paratypic male from the San Francisco Mountains,[1] Dominican Republic, taken September, 1905, by A. Busck, and in the National Museum series.[2] No noteworthy differences exist between the two specimens.

Cariblatta plagia,[3] new species

Plate I, Figures 18 to 20

Cariblatta punctulata Hebard, 1916, Trans. Amer. Entom. Soc., XLII, p. 158. (In part.) Manati and Rio Piedras, Porto Rico.

A near relative of *C. islacolonis*, agreeing with it in the pronotal form, as well as the color pattern of the pronotum and tegmina, but differing in the very striking features of the male subgenital plate, which include an obliquely subtruncate median production, and in the complicated and distinctive facial pattern, which also has no sharply defined interocular occipital bar, the markings of that area merging into the general facial design.

Type.—Male; Arecibo, Department of Arecibo, Porto Rico. December 22, 1921. (F. Seín.) [Academy of Natural Sciences of Philadelphia, Type No. 5402.]

The following description is of features of difference from the above descriptions of *C. cryptobia* and *C. islacolonis*.

Interspace between eyes slightly greater than occipital depth of eye, broader than in *cryptobia*, narrower than in *islacolonis*.

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[1] See footnote 1, page 11.

[2] This is the individual described by Hebard (1916, Trans. Amer. Entom. Soc., XLII, p. 158), as the male sex of *C. punctulata* (=*delicatula*). His figures of that species, however, and the female described, represent true *delicatula*.

[3] From πλάγια, placed sideways, slanting, athwart, in allusion to the oblique truncation of median portion of the male subgenital plate.

Pronotum as in *C. islacolonis*, but lateral margins faintly more broadly arcuate point of greatest width faintly more caudad of middle of pronotum than in *C. islacolonis*.

Subgenital plate with lateral sections subvertical, the plate thus nearly scoop-shaped and the ventral surface with its lateral boundaries weakly conveying distad; median section of distal margin produced into a projection of subequal width, with straight, parallel sides and having its distal extremity strongly oblique truncate, the truncation faintly concave, the distal point sinistral in position and decidedly acute, a few fine serrulations present sinistrad on that margin of this production; laterad of median production the distal margin is weakly produced into low, broad, obtuse-angulate infra-stylar shoulders, the sinistral of which is distinctly larger and more evident that the dextral, surface of plate for short distance between median production and sinistral shoulder arcuately and longitudinally impressed: styles subequal in size, sinistral slightly the larger, both with dorsal surface armed with decurved unguiculiform spines, these most numerous on the larger sinistral style.

General coloration as in *C. cryptobia* and *islacolonis* except as follows: interocular region without any definite interocular bar, the occiput itself with paired lateral dark dots and a median pair of closely placed dashes, which sometimes partly fuse; from middle (longitudinal) line of eyes ventrad to and including interocellar region the face is wholly dark, except for irregular pale juxtaocular margins and one or two pairs of enclosed pale dots, one pair being lacking in some specimens and occasionally the ventral pair is not complete and represents solely evaginations of the irregular ventral margin of this dark area; ventrad of this are two transverse arcuate series of dark dots about four in each series, those of the ventral series larger and occasionally fused into lateral bars, rarely the two median dots of the dorsal series are fused; ventro-lateral margins of face infuscate. Pronotal pattern as figured (Plate I, fig. 19), the supra-cervical markings occasionally subobsolete (in type). Tegmina occasionally without dark markings (type), generally with that on the anal sulcus alone developed, rarely (one Manati male) the discoidal streak is as well indicated.

Venter of abdomen infuscate trilineate as in *C. cryptobia*, but bars not joining on or quite reaching the subgenital plate, all variable in intensity and extent, occasionally broken into series of segmental dots, while the lateral series are always more distinctly and definitely indicated than the median one.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Arecibo, Porto Rico, type	7.5	1.7	2.2[1]	7.8	2.1 mm.
♂, Rio Piedras, Porto Rico, paratype	7	1.6	2.3	7	2
♂, Manati, Porto Rico, paratype	7.3	1.8	2.5	7.9	2.2

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[1] Approximate, as one margin of pronotum is damaged.

In addition to the type we have before us four paratypic males, all from Porto Rico: one taken at Rio Piedras, Department of Humacao, December 18, 1911, (T. H. Jones), from the U. S. National Museum; three taken at Manati, Department of San Juan, June 27 to 29, 1915, (Lutz and Mutchler; at automobile headlights), from the American Museum and the Hebard Collections.[1]

These specimens show some variation in the exact shape of the median production of the male subgenital plate, which has its oblique truncation subarcuate with the dextral obtuse-angulation less evident in several Manati males and that from Rio Piedras. Rarely the acute sinistral angle of the same production is attenuately developed until it is really spicate. In no case, however, is this variation of such character as to cause any doubt as to the true identity of males of this species. The variation found in the facial markings is of a relatively minor character,[2] while the pronotal marking shows intensive and recessive extremes, the latter virtually lacking supra-cervical markings, which are quite evident in all the material except the type. The pattern of the tegmina varies appreciably from the recessive condition of the type, which lacks all dark markings, and consequently pattern, to the opposite extreme, which has evident infuscation of the anal sulcus, most pronounced proximad and distad, and an evident spot on the discoidal vein in the same position as in *C. cryptobia* and *islacolonis.*

All the localities from which this species is known are in the northern coastal section of Porto Rico. Whether it is limited in distribution to this area remains to be determined.

Cariblatta stenophrys,[3] new species

Plates I, Figure 21; II, Figures 1 and 2

Cariblatta punctulata Hebard, 1916, Trans. Amer. Entom. Soc., XLII, p. 158. (In part.) Mayaguez and Adjuntas, Porto Rico.

This species possesses the pronotal pattern of the preceding members of the *Insularis* Group, and has a tegminal pattern basically similar to that of the same species. The diagnostic features of the present species are an exceptionally narrow interocular space, a heavily infuscate and complicated facial and occipital pattern and a type of male subgenital plate somewhat suggesting that of the preceding species, *plagia*. The relationship to *C. plagia* is close, but the extreme narrowness of the interocular space, aside from the other features, is sufficient to distinguish the two species. The features of difference from the species of the group which follows the present one in a linear sequence are given in their diagnoses.

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[1] Hebard recorded all of these specimens as *C. punctulata* (1916, Trans. Amer. Entom. Soc., XLII, p. 163).

[2] The face of the type has been discolored in drying and our color notes of this area are drawn from the other specimens.

[3] From *στενὸς*, narrow, and *ὀφρύς*, brow, in allusion to the narrow interocular space.

TYPE.—Male; Mayaguez, Department of Mayaguez, Porto Rico. June 21–23, 1915. (Lutz and Mutchler; at light.) [New York Academy of Sciences; American Museum of Natural History.]

The characters here given for the species are those not shared with the preceding members of this group, and which have by themselves or in combination diagnostic value for *stenophrys*.

Size slightly larger than *C. plagia*, general form similar.

Head with eyes more prominent than usual in the group; occipital interocular space quite narrow, hardly more than two-fifths as great as occipital depth of eye.

Pronotum with outline and proportions as in *C. cryptobia*, except for caudal margin being faintly more flattened.

Tegmina surpassing apex of abdomen by distinctly more than pronotal length.

Subgenital plate showing some suggestion of that of *C. plagia* in its general type, but median production is narrower, has its distal extremity obliquely subarcuate, with both angles broadly rounded; infra-stylar shoulders developed much as in *C. plagia*: styles more equal in size, although sinistral is the larger.

ALLOTYPE.—Female; Adjuntas, Department of Aguadilla, Porto Rico. June 8–13, 1915. (F. E. Lutz; beating.) [New York Academy of Sciences; American Museum of Natural History.]

Differing from the features given for the male as follows: eyes less prominent than in male; occipital interocular space much greater, subequal to occipital depth of eye. Pronotum slightly less distinctly transverse than in male, length of same faintly greater in proportion to greatest width. Subgenital plate large, relatively broad; distal margin broadly arcuate between shallow infra-cercal emarginations, immediate apex very faintly obtuse-angulate.

General coloration as usual in the group, a dark pattern of russet to mummy brown on a light ochraceous-buff ground. The general details of the dark pattern are as follows: occiput with four longitudinal dark dashes, the median pair closely placed or contiguous and partially fused (male). From interocular region ventrad extends a complicated dark facial pattern, without a definite interocular bar except as a part of the whole, the exact form of which is best shown by our figure, but which is composed of a dorsal transverse blotch connected laterad with a more ventral transverse arcuate marking, which in the female is not as extensive and in the male is much more extensive than that dorsad of the same, a vertical marking bisects the more ventral maculation and may or may not fuse with the more dorsal transverse bar; in the male this vertical marking broadens ventrad and becomes involved with the median pair of an arcuate series of four dots; ventrad of this series of four dots is another similar one of larger dots and of more extent transversely. Eyes ranging from hays russet to chestnut-brown.

Pronotum with pattern well illustrated by the accompanying figure, the longitudinal elements and tendencies distinctly pronounced and the supra-cervical lines very evident. Tegmina with a proximal and a distal infuscation on the anal sulcus, with or without a connecting pencilled lineation along the sulcus, a similar infuscation on the discoidal vein as in the related species; covered portion of right tegmen occasionally (type) markedly infuscate. Venter of abdomen with the usual median and inter-marginal lateral longitudinal dark bars; median much less evident and extensive than the laterals, never reaching more than the extreme base of the subgenital plate, while in the female sex the lateral bars reach to slightly caudad of the infra-cercal emarginations. Limbs marked with dark as in related species.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Mayaguez, Porto Rico, type	8.8	2	2.7	9	2.6 mm.
♀, Adjuntas, Porto Rico, allotype	9	2.1	2.8	9.8	2.6
♀, Mayaguez, Porto Rico, paratype	7.5	1.9	2.7	7	2.4

In addition to the type and allotype we have before us two paratypic females, one taken with the allotype, bearing the same data and from the same collection, the other from Mayaguez, Porto Rico, taken January, 1899, by August Busck, and from the United States National Museum.[1] An immature specimen forming part of the Adjuntas series is also before us.

The Mayaguez female is appreciably depauperate, being distinctly smaller in size and with the tegmina surpassing the apex of the abdomen by less than the pronotal length.

The type is the most intensively colored of any of the specimens, the Mayaguez female the most recessively colored. The Adjuntas females are in general intermediate between the extremes.

The species is known only from the western portion of Porto Rico, extending from sea-level (Mayaguez) to a considerable elevation in the Cordillera Central (Adjuntas).

Cariblatta antiguensis (Saussure and Zehntner)

Plate II, Figures 3 and 4

Theganopteryx (*Pseudectobia*) *antiguensis* SAUSSURE AND ZEHNTNER, 1893, 'Biol. Cent.-Amer., Orth.,' I, p. 17. (In part.) ♀; Antigua; Cuba.

VIRGIN ISLANDS.—No further locality, V, 3, 1922, (C. E. Wilson; in dead leaves), 1♂, [U. S. N. M.]. St. Croix, VI, 10, 1917, (Harold Morrison), 1♀, [U. S. N. M.].

ST. BARTHOLOMEW.—(Forsström), 1♀, [Hebard Collection].

Hebard[2] considered this name to represent a synonym of *insularis*, which is, however, as far as we know a peculiarly Jamaican insect. Examined anew in the light of present material, not available in 1916, it is evident that *antiguensis* as limited to the Antiguan portion of its original material is in all probability a member of the present group of species, quite distinct from *insularis*.

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[1] These specimens were recorded by Hebard (*vide supra*), along with the type and allotype, as *C. punctulata*.

[2] 1916, Trans. Amer. Entom. Soc., XLII, p. 175.

The species before us, which we are considering *antiguensis* as it agrees fairly well with the inconclusive original description based solely on the female sex, is more closely related to *C. stenophrys* than to any other species known to us. The interspace between the eyes is distinctly broader than in *stenophrys*, while the facial pattern is very similar. The male genital features are more like those of *stenophrys* than any other species.

The noteworthy features of difference from *stenophrys*, as shown by the male sex, are as follows:

Head with occipital interspace between eyes subequal to occipital depth of eye. Subgenital plate of male as asymmetrical as in *stenophrys*, but median production broader and less produced, its distal margin similarly obliquely arcuate; infrastylar shoulders very weak; styles much as in *C. stenophrys*.

Color pattern basically much as in *C. stenophrys*. Occiput with four dash-like maculations, the median pair closely placed. Dorsal blotch of facial marking much as in *stenophrys* but with paired enclosed pale blotches larger, circular and in position hardly dorsad of the ocelli, ventral margin of the dorsal blotch with its median production narrower, more subquadrate; two transverse arcuate series of dark dots, four in each, are present on the lower face, the more ventral occasionally (St. Bartholomew female) forming a continuous dark bar except for a narrow median break. Pronotal pattern much as in *stenophrys* but generally less strongly indicated and with fewer of the basic components evident. The St. Bartholomew female has the pronotal pattern as well indicated as in *stenophrys*. The usual tegminal markings of the group may be absent, the anal sulcus either having a distinct dark lining proximad or being virtually without dark marking, while there is no marking indicated on the discoidal vein. Venter of the abdomen with dark lateral intermarginal lines, these occasionally (in the single male) reduced to stigmatic spots, and in the St. Bartholomew female infuscating much of the entire lateral sections of the abdomen.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Virgin Islands	7.9	2	2.8	8.6	2.4 mm.
♀, St. Croix	7	2	2.9	7.9	2.5
♀, St. Bartholomew	8.1	2.2	3.1	9.4	2.7

The Cuban material originally referred to *antiguensis* in all probability was incorrectly associated, and we feel Hebard was correct[1] in suggesting this probably represents *C. punctulata*, which is one of the two species of this genus known from Cuba.

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[1] 1916, Trans. Amer. Entom Soc., XLII, p. 175.

The species, aswe have interpreted it, is known only from the Virgin Islands (specifically solely St. Croix) and the northern Lesser Antilles (Antigua and St. Bartholomew).

Cariblatta jamaicensis, new species

Plate II, Figures 5 to 8

Related to *C. stenophrys* from Porto Rico, described above, agreeing in general form and main features of the color pattern, but readily separated by the somewhat broader interocular space, which, however, is still distinctly narrower than in the majority of the species of the genus, in the different arrangement of the occipital and facial pattern, and in the very different male subgenital plate, which is of a type with no median projection, and in ventral aspect much suggesting that of the otherwise very different *C. reticulosa*. When viewed in caudal aspect, however, the male subgenital plate is seen to be most distinctively formed, with paired reflexed marginal lamellations unlike in any other species, but which structures have analogs in *C. insularis* and *landalei*. *Jamaicensis* is, apparently, a connecting link between *C. plagia* and *stenophrys* on one hand and *C. insularis* and *landalei* on the other.

TYPE.—Male; Balaclava, St. Elizabeth Parish, Jamaica. May 1, 1909. (A. E. Wight; in decaying herbage.) [Museum of Comparative Zoölogy.]

Compared with *C. stenophrys* the present species shows the following noteworthy features.

Head with eyes as prominent as in *stenophrys;* occipital interocular space almost four-fifths as great as occipital depth of eye.

Pronotum of the same general outline and proportions as in *C. plagia*, less transverse and more trapezoidal than in *C. stenophrys*.

Tegmina as in related species.

Subgenital plate slightly transverse, bluntly scoop-shaped; lateral margins arcuately converging distad when seen in ventral aspect; distal margin, when seen from venter, broad, sinuato-truncate, having on each side in usual position of the infra-stylar shoulders in preceding related species, a low, broad, rounded elevation, becoming obsolete proximad and terminating at distal margin in obtusely rounded weak productions of same; portion of border between these productions very weakly arcuate when seen from venter; seen in caudal aspect distal section of subgenital plate is found to be developed into vertical lamellate extensions dorsad of lateral productions of distal margin, these lamellate extensions longer transversely than high, attached solidly to distal margin mesad, free and strongly incurved latero-cephalad, dorsal margin of extensions subtruncate, obliquely subtruncate mesad; styles not evident.

ALLOTYPE.—Female; same locality as type. April 15, 1909. (A. E. Wight.) [Museum of Comparative Zoölogy.]

Differing from the features given for the male as follows: eyes less prominent; occipital interocular space much wider, from equal to slightly greater than occipital depth of eye. Pronotum faintly less transverse than in male, the length slightly greater in proportion to greatest width. Subgenital plate essentially as in the same sex of *C. stenophrys*.

General coloration as usual in the group, the dark pattern, except for facial and other details here mentioned, essentially as in *C. stenophrys*, described above. Occiput with four longitudinal dark lines in type, the median two merged in the allotype, all fusing ventro-cephalad into a narrow transverse occipital bar, or occipital bar solid but caudad showing its respective components; the occipital bar has its ventral border, which is no lower than the middle of the occipital depth of the eyes, distinctly and sharply defined and separated from the facial pattern by a considerable extent of pale base color. Facial pattern consisting of two major elements: (a) the first is interantennal in position and consists of an extensive dark blotch, its dorsal margin reaching from the eyes narrowly across the dorsal section of the antennal scrobes, thence concavely emarginate on each side of a median dorsad projecting subquadrate extension; a median vertically disposed oval of the pale base color may (♀) or may not (♂) be completely enclosed in the dark area, in the latter case it appears as an invagination of the ventral margin of the dark area; ventral margin of this area broadly arcuate between antennal scrobes, narrowly emarginate beneath median oval pale area in the females seen; (b) ventral side of antennal scrobes bordered by dark areas, which are connected across the face by an irregularly arcuate dark bar, faintly interrupted mesad, and occasionally laterad. Eyes ranging from cinnamon-brown (male) to mummy brown (female). Pronotum with pattern as shown in the accompanying figure, essentially as in *C. stenophrys*. Tegmina of the male with no distal infuscation on the anal sulcus, in the female the usual dark markings are obsolete, possibly due to the effects of a preservative as the specimens at some time have been immersed in a solution. Venter of abdomen pale with intermarginal dark bars, broken and narrow to solid, broad and continuous in the male, not reaching the subgenital plate and on the more distal segments touched by them represented solely by dots, in the females they reach in one extreme (recessive) to shortly distad of the infracercal emarginations, on the more proximal segments even more decidedly broken into mere stigmatic dots, in the other extreme (intensive) they join on the subgenital plate, which is largely dark, while the segments distad to and including the antepenultimate are also solidly infuscate.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, type	9.2	1.7	2.6	8.9[1]	2.4 mm.
♀, allotype	7.6	1.8	2.7	8.3	2.3

We have seen in addition to the type and allotype of this species, which has most distinctive genitalic features in the male, five females taken from the fruit steamer 'Runa' at Philadelphia, from Port Antonio, Jamaica, May 8, 1922, by Max Kisliuk, and now in the collection of the Academy of Natural Sciences of Philadelphia. The form of the subgenital plate of the male is clearly that of a step in the line of development of the more highly specialized type seen in *C. insularis* and *C.*

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[1] Approximately. The apices of both tegmina have been somewhat damaged, so that an exact measurement cannot be taken.

landalei, from the same island. Whether *jamaicensis* is restricted in distribution to any definite area of Jamaica remains to be determined.

Cariblatta insularis (Walker)

Plate II, Figure 9

Blatta insularis Walker, 1868, 'Catal. Blatt. Brit. Mus.,' p. 101. ♀; Jamaica.

We have little information on this species additional to that given by Hebard in his discussion of the species.[1] The only locality known to him from material was Montego Bay, Jamaica. Whether this form, which has such remarkably distinctive male genitalia, is restricted to western Jamaica, remains to be determined.

Uvarov has examined the type of this species and compared it with material sent by us. His comment is as follows: "The type is in extremely bad condition, having been preserved in spirit; wings quite crumpled and almost unfit for examination. However, your identification seems to be correct though I hesitate to say so quite definitely." Under the circumstances it seems the use of the name *insularis* for this species is warranted and advisable unless the contrary is shown to be true.

We have removed from the synonymy of *insularis*, Saussure and Zehntner's *Theganopteryx* (*Pseudectobia*) *antiguensis*, from Antigua, which Hebard, in 1916, had considered as in part this species. On a preceding page we have discussed *antiguensis*, which we now consider to be a distinct member of the *Insularis* Group of the genus, probably restricted to the Virgin Islands and certain of the northern Lesser Antilles.

The relationship of the present species to those here associated with it is very close. The pronotal form is as in *C. stenophrys* and the pattern is quite similar, being well figured by Hebard, who also gave an excellent illustration of the facial pattern. The latter strongly suggests that of *C. jamaicensis*, while the form of the male subgenital plate clearly indicates the position of *insularis* in relation to *C. jamaicensis* and to *C. landalei*, both here described.

That the island of Jamaica furnished a home for four of the eight members of the *Insularis* Group, which is distributed from Jamaica eastward to the northern Lesser Antilles, but is absent from Cuba and the Bahamas, would seem to indicate that a large part of the development of the group may have taken place in Jamaica. On the other hand the Jamaican forms seem restricted to definite sections of the island; from no single locality has more than a single species been seen. Whether future work will show these apparent localizations to hold true, or that two or more of the forms occur together under identical conditions, remains to be determined.

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[1] 1916, Trans. Amer. Entom. Soc., XLII, pp. 175–177, Pl. xi, figs. 8–12, Pl. xii, figs. 14–16.

Cariblatta landalei,[1] new species

Plate II, Figures 10 to 14

This most interesting species is more nearly related to *C. insularis* than any other species, sharing a marked and unusual "puckering" of the distal section of the male subgenital plate, having a pronotal pattern very similar and a facial pattern which has much in common with that of both *jamaicensis* and *insularis*. The form of the male subgenital plate is, however, so remarkably distinctive that it alone will prevent any possibility of confusion of the male of this insect with the same sex of the other species. The venter of the abdomen has a color pattern quite characteristic when compared with *C. insularis*, while the tegmina have a distinctive lineate pattern.

The female sex possesses a larger and more strikingly developed subgenital plate than the same sex of *insularis*, which, taken with the ventral abdominal pattern and that of the face, as well as the tegminal lineation, will serve to identify females of the species.

TYPE.—Male; Pleasant Hill, Blue Mountains, Jamaica. Elevation 3700–3800 feet. July 28, 1923. (Rehn; in bracts of banana blossoms.) [Academy of Natural Sciences of Philadelphia, Type No. 5404.]

The following features are chiefly those of noteworthy difference from *C. insularis* as described by Hebard.[2]

Size small; form elongate and slender; tegmina very slender.

Head with occipital interocular space subequal to occipital depth of eye.

Pronotum with general form as in *C. insularis*, but lateral angles at point of greatest width more evident, less rounded than in *insularis*.

Tegmina attenuate, with wings surpassing apex of abdomen by twice the pronotal length; anal field more elongate pyriform than in *insularis*, its attenuation in proportion to the general elongation of the tegmina.

Subgenital plate moderately transverse, in general appearance puckered or constricted in folds disto-mesad: disto-lateral margins converging, oblique subtruncate; general appearance of medio-distal portion of margin roughly concave-emarginate, the details of this area showing obtuse-angulate lateral angles which are subvertical in position and analogous to similar structure in *jamaicensis* and *insularis*, a small median arcuate labiation which is continued upon the surface of the plate proximad in a marked convex fold, and paired infra-stylar emarginations of unequal emphasis which are continued proximo-laterad on the surface of the plate and are separated from the median convex fold by marked concave folds; styles small, almost hidden in anal orifice, their dorsal surface with recurved teeth. The subgenital plate is slightly asymmetrical, in the exact character of the folding of its ventral surface as well as the specific details of the medio-distal portion of the margin.

ALLOTYPE.—Female; same data as type, except date is July 24, 1924. [Academy of Natural Sciences of Philadelphia.]

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[1] We take pleasure in dedicating this interesting species to Mr. and Mrs. W. H. Landale, of Pleasant Hill House, in appreciation of their kindly interest and assistance to Mr. Rehn, when he visited with them in the summer of 1923.

[2] 1916, Trans. Amer. Entom. Soc., XLII, p. 175–177.

Differing from the description of the male sex chiefly in the following features.

Size apparently smaller than in male sex, due to shorter tegmina.

Head with occipital interocular space slightly greater than occipital depth of eye. Tegmina surpassing apex of abdomen by not more than length of pronotum.

Subgenital plate large, moderately produced, its greatest length subequal to proximal width; pre-cercal section of lateral margins moderately arcuate, infra-cercal emarginations weak and very shallow, distal portion of margins nearly straight convergent to the very narrowly rounded apex.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, type	8.5	2	3	10.5	2.7mm.
♂, paratype	8.5	1.9	2.8	9.4	2.7
♀, allotype	9	1.9	2.7	9.8	2.5
♀, paratype	8.3	1.9	[1]	9	2.7

General coloration of head, disk of pronotum, all of tegmina except marginal and external portion of scapular fields, dorsal and ventral surfaces of body and limbs ochraceous-buff, varying very slightly in depth; dark pattern, as described, prout's brown to mummy brown. Occiput with a transverse dark interocular bar, which dorsad is slightly deeper laterad than mesad: interantennal blotch of the facial pattern large, reaching from scrobe to scrobe, its greatest depth more than one-half the width of the bulk of the maculation, its dorsal margin with three angulations, the median the most extensive, an enclosed median spot always present, usually oval and rarely a trefoil in shape; a transverse infra-antennal dark bar of sinuate pattern strikingly indicated, occasionally broken mesad: ventral portion of face with four transversely disposed dark blotches along the clypeal suture, the median pair subtrigonal, the lateral transversely elongate and narrow. All details of the facial pattern may be more clearly interpreted by consulting Plate II, fig. 11.

Disk of pronotum with pale base color somewhat lighter than on other surfaces; lateral portions clear hyaline; dark pattern as shown in Plate II, fig. 10, the paired central areas of this pattern distinctly clouded and blotched, with the component lineations less clearly evident than usual, supra-cervical lines sharp, with or without a transverse connecting line at the cephalic margin.

Tegmina with marginal field and costal half of scapular field clear hyaline; dark marking at base of anal sulcus decided and covering about a third of the sulcus; dark blotch on discoidal trunk in the usual position found in this group of species, generally extending distad along the humeral trunk as a dark cloudy line, in one specimen reaching half-way to the tegminal apex and, while varying considerably in depth and extent, this marking is always indicated. Venter of abdomen with broad, continuous, strongly marked intermarginal dark longitudinal bars, which generally meet and fuse on the proximal half of the subgenital plate. In the female sex this dark coloration covers a very large portion of the quite large subgenital plate. Occasionally a median dark bar is briefly indicated proximad on the venter of the abdomen. Limbs with a preapical dorsal dark femoral marking which on the cephalic pair is also indicated on the cephalic face, a dorsal lineation from the same marking extending well proximad on these cephalic femora and a lesser distance on the median femora; an evident pregenicular dark spot on all the tibiæ, vicinity of all spine insertions marked with dark, ventral margins of caudal femora sublineate with dark color.

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[1] Pronotum slightly damaged.

In addition to the type and allotype we have before us nine male and seven female paratypes, all taken at the type locality. Of these two males and one female were secured on July 21, two males and three females on July 24, one male and one female on July 25 and the remainder on July 28. All were taken from under the drying bracts of banana blossoms in several tracts of mixed banana and coffee trees, at 3800 feet elevation on the Pleasant Hill estate. The species is exceedingly active and the series was taken only by stripping off the bracts while a deep net enveloped the greater portion of the blossom end of the cluster. In addition we have a male individual in the instar preceding maturity, taken on July 21 and under the same conditions as the others.

The measurements given show the limited extent of size variation that is present in the species, the figures presented representing approximately the range of size in each sex.

The width of the occipital interspace between the eyes varies slightly in the male sex, ranging from slightly narrower than the occipital depth of the eye to very faintly greater than the same. In the female sex this width shows little variation and is always appreciably greater than the depth of the eye.

The subgenital plate of the male varies but little in the bulk of the series in the exact strength of the foldings of the medio-distal region, these being as heavily indicated as described for the type in all except two individuals, in one of which the folds are less evident although the general form is the same, while in the second individual the folds are greatly reduced in size and character, so that they would at first examination seem non-existent, and the median protuberance is virtually absent, although the broad emargination and its lateral flanking angulations are fully indicated. The first-mentioned specimen is teneral and this condition doubtless explains the unemphasized character of the folds, while the aberration of the second individual has every appearance of being atavistic or teratological. Similar conditions are not rare in male blattids which normally possess highly specialized supra-anal and subgenital plates.

One female bears a partially protruded oötheca, which is carried with the carina dorsad.

Cariblattoides,[1] new genus

This genus is related to *Cariblatta* and *Neoblattella*, rather nearer the former, and showing to *Neoblattella* much the same character of relationship as does *Cariblatta*. The intimate relationship of the three groups is clearly evident, but their proper sequence in a linear arrangement is not easy to determine. The principal feature of difference from *Cariblatta* (as represented by *C. delicatula*, the genotype, and also by the rather aberrant *C. punctipennis*) is the distinctly flattened and deplanate pronotum, which is relatively larger than in *Cariblatta*. In addition, the tegmina are seen to be longer, regularly more narrow with the margins subparallel. Through the aberrant *Cariblatta punctipennis* the generic relationship is seen to be close, but the two entities are distinct, clearly recognizable when studied, and with individual combinations of characters, which are not, however, clearly expressible as differential features.

From *Neoblattella* (using the genotype, *N. adspersicollis*, for comparison), the new genus is chiefly distinguished by the greater interspace between the eyes in both sexes, the palpal form, which resembles that of *Cariblatta*, the generally fewer discoidal sectors of the tegmina, the strongly deplanate pronotum, and the less strongly specialized tarsal claws. The *Neoblattella* complex is so extensive, and our exact information on the species really composing it so limited, that we can speak of it only in a qualified manner. We are restricting comparisons with *Neoblattella* to the genotype and closely allied species, as it is becoming more evident that a number of genera are really included in the mass of species generally assumed to belong to *Neoblattella*.

Generic Description.—Size small; form depressed; females slightly broader and heavier than males, size approximately similar. Head subdepressed, distinctly and broadly visible cephalad of pronotum; interocular space wide, considerably greater than depth of eye; lateral margins of face regularly and relatively strongly convergent ventrad: antennæ elongate, first joint elongate, large, cingulate on portion of proximal section: maxillary palpi with third joint elongate, slender; fourth joint shorter than third joint; first joint slightly shorter or slightly longer than fourth joint.

Pronotum with dorsum appreciably deplanate, transverse elliptical in outline, greatest width faintly caudad of the middle; cephalic margin truncato-arcuate, narrower than caudal margin; lateral margins arcuate; caudal margin broad, truncato-arcuate: lateral sections very broad, little differentiated from disk by contour, hyaline; disk in shape roughly octagonal, the cephalic and lateral angles, at least, rounded; caudal hyaline section well indicated.

Tegmina elongate lanceolate, considerably surpassing the abdomen in both sexes (female of *instigator* unknown): costal margin moderately arcuate proximad, sutural margin almost straight: scapular field broad; discoidal sectors longitudinal, six to seven in number (including the median and ulnar and rami of the median veins); anal sulcus strongly arcuate proximad, straight oblique in greater portion of length; anal field elongate pyriform; diagonal channel (diagonal vein of authors) of right tegmen well indicated. Wings elongate, relatively narrow, moderately iridescent: mediastine and a number of costal veins clavate; ulnar vein quadriramose; axillary vein with three rami in distal two-thirds; intercalated triangle small but distinctly and clearly defined.

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[1] From *Cariblatta* and *ειδος* form.

Abdomen unspecialized: supra-anal plate transverse in both sexes; cerci elongate, fusiform, depressed, composed of eleven segments, apex acuminate: subgenital plate of male symmetrical or weakly asymmetrical, with pair of very short, thick, equal or unequal styles, the surface of which is armed with adpressed claw-like spines: subgenital plate of female large, scoop-shaped, produced, narrowing distad.

Cephalic femora with ventro-cephalic marginal spination of "Type A," proximad in the series being a few (four) large spines, followed by a variable number of short or very short, but distinct and robust, spines, distad two large unequal spines; ventro-caudal margin of cephalic femora with three to four spines in distal half. Median and caudal femora with each ventral margin having a single distal spine, the remainder of the margins with other long spines. Tarsi with well-developed arolia; pulvilli small, present on four proximal segments, terminal, acute, produced; tarsal claws with an internal flange, the margin of which is straight or subserrulate.[1]

A color feature shared by both of the species of the genus, and which is to that extent a generic feature, although we would hesitate definitely to call it such, is the opaque white border of the costal margin of the wing. This is narrow proximad, expanding to include the clavate portions of the costal veins and then narrowing and becoming obsolete before the apex.

Genotype.—*C. suave*, new species.

Key to Species

Maxillary palpi with fourth joint distinctly longer than fifth joint. Head more depressed. Tegmina with discoidal sectors eight in number, weakly nodulose in distal half. Styles of male subgenital plate unequal in size. Cephalic femora with smaller spines of ventro-cephalic margin six to seven in number. General coloration not strikingly bilineate. Head without dark interocular bar. (Porto Rico.) .... *suave*, new species.

Maxillary palpi with fourth and fifth joints subequal in length. Head less depressed. Tegmina with discoidal sectors seven in number, non-nodulose. Styles of male subgenital plate equal in size. Cephalic femora with smaller spines of ventro-cephalic margin thirteen in number. General coloration strikingly bilineate on pronotum and to a lesser degree on closed tegmina. Head with dark interocular bar. (Cuba.) .... *instigator*, new species.

Cariblattoides suave,[2] new species

Plate III, Figures 1 to 5

Type.—Male; Aibonito, Guayama, Porto Rico. July 14–17, 1914. (H. G. Barber.) [New York Academy of Sciences; American Museum of Natural History.]

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[1] Apparent only when highly magnified.

[2] From *suavis* = agreeable.

The leading features separating this species and *C. instigator* are given above in the key.

Size small; form depressed; surface of dorsum moderately polished.

Head appreciably flattened, in outline elongate trigonal, but with the eyes slightly rounded bullate, the infra-antennal portion of head thus apparently narrowed in addition to the regular convergence of the lateral margins of that portion: vertex straight, interocular space equal to one and a half times the greatest depth of eye: face moderately arcuate transversely, nearly straight longitudinally from inter-antennal region: eyes subreniform in outline, strongly narrowing ventrad: ocellar spots of medium size, more distant than most approximate points of eye margins: antennæ elongate; maxillary palpi with fifth joint appreciably shorter than fourth joint, compressed, regularly narrowing from proximal portion.

Pronotum with cephalic margin moderately arcuate, regularly passing into lateral margins; lateral hyaline portions very broad, but little narrowing cephalad.

Tegmina surpassing the apex of the abdomen by slightly more than the length of the pronotal disk, relatively narrow, approximately subequal in width in the greater portion of length, the apical section with costal margin faintly arcuate convergent to the immediate apex, which is nearer the costal than the sutural margin, narrowly rounded acute-angulate: marginal field relatively broad, elongate; scapular field broad; principal veins and rami scattered subnodulose distad; costal rami in scapular field numerous, oblique; discoidal sectors six to seven in number, including main median vein and ulnar vein; anal field with five axillary veins. Wings with apex of anterior field narrowly rounded rectangulate; six costal and the mediastine veins elongate clavate, less heavily so than in *instigator*.

Supra-anal plate with margin obtusely arcuate, very faintly emarginate mesad, the margin of plate with regular, spaced series of long bristles, some directed horizontally, other deflected ventrad: subgenital plate broad, flattened, moderately asymmetrical, the sinistral side of the distal margin markedly sigmoid, the dextral side shorter, weakly sigmoid, apex of plate slightly dextral in position, bilobate emarginate in shape; styles unequal in size, the left short and thick, appreciably recurved and with one dorsal spine larger than others and unguiculate in form, the right style very short, in fact a mere knob or base for the teeth on its surface.

Cephalic femora with ventro-cephalic margin armed with two large, unequal, distal spines, then proximad a series of seven to eight short, well spaced, thick and heavy spinulations, followed by a proximal group of four much more widely spaced, large spines.

Allotype.—Female; same data as type.

Differing from the description of the male sex (type) in the following features.

Head slightly less depressed than in male, with the eyes slightly less evident when seen from ventral surface, the infra-antennal portion of head narrowed solely by the regular convergence of the margins.

Pronotum slightly more transverse, the lateral margins more arcuate divergent caudad to the point of greatest width; lateral hyaline portions very broad.

Tegmina slightly shorter and broader proportionately than in the male.

Supra-anal plate as in male; subgenital plate projecting appreciably distad of supra-anal plate, large, scoop-shaped, produced, narrowing distad, distal margin strongly arcuate, with numerous chætiform hairs.

General color of male shining dark pitch brown, this color embracing the disk of the pronotum, all of the tegmina excepting the marginal and costal four-fifths of the scapular fields, and the dorsal and ventral surfaces of the abdominal and thoracic segments. Lateral portions of pronotum and the costal portion of the tegmina hyaline, of the tegmina tinted with buffy near the sharp dividing line between the dark-colored and hyaline areas. Head mars yellow to mars brown, the buccal region, ocellar spots and palpi antimony yellow, the latter fuscous tipped; eyes cinnamon-brown to mummy brown; antennæ of general color except that the proximal joint is yellowish with lines on internal and external faces of the general color. Wings infumate with pitch brown, the tone varying in depth, always strongest distad, the costal margin in the vicinity of the clavate costal veins and narrowly distad, opaque white. Femora, tibiæ, two proximal tarsal joints and a portion (intensive) or most (recessive) of coxæ antimony yellow to pale ochraceous-orange, distal portion of tarsi pitch brown. Cerci narrowly tipped with yellowish or whitish.

General coloration of female of much the same type as in male but never so sharply contrasted or as solidly grouped, and with ventral surface of abdomen different. General color ranging from pale buckthorn brown to weak pitch brown. Head mars yellow, the face largely as pale as the buccal region alone in the male; palpi pale, hardly tipped with dark; eyes tawny to mummy brown; antennæ as in male except that mesad and distad the pitch brown passes into dresden brown. Pronotum with disk never solidly colored, always with indications, more or less evident, of the usual central lyrate pattern of species of *Cariblatta*, laterad the disk bears indications of paired diverging bars of prout's brown, these not being sharply defined and entirely independent of the lyrate pattern, which shows through the less opaque bars. Tegmina with the contrast between the two sections but little indicated in those of relatively pale (recessive) general coloration, more decided in the darker (intensive) specimen, which latter has the dark section irregularly sprinkled with translucent areas of pale ochraceous. Wings as in male. Dorsum of abdomen pitch brown; venter of abdomen ranging from pitch brown with a rufescent subgenital plate, which is bordered with pitch brown (intensive), to ochraceous-buff with a pitch-brown median portion proximad, the intermediate condition showing suffusion of the lateral pale borders. Limbs as in male.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Aibonito, Porto Rico, type	8.6	2.3	3.3	10.3	3 mm.
♂, Aibonito, Porto Rico, paratype	8	2.2	3.1	9.7	3
♂, Aibonito, Porto Rico, paratype	8	2.2	3.2	10.3	3
♂, Arecibo, Porto Rico, paratype	7.3	2	3.1	9.5	2.9
♀, Aibonito, Porto Rico, allotype	9.8	2.6	3.7	11.5	3.5
♀, Aibonito, Porto Rico, paratype	8.5	2.4	3.4	10	3
♀, Aibonito, Porto Rico, paratype	9.4	2.6	3.7	10.3	3.1

In addition to the type and allotype we have before us, all from Porto Rico, one male and two females, taken with the type and allotype; a third male taken at Aibonito, June 1–3, 1915, (Lutz and Mutchler; hills north of town); a fourth male taken at Arecibo, Arecibo, July 30–August 1, 1914, (H. G. Barber; beating on dry limestone hills), and a fifth male from Rio Piedras, San Juan, July 8, 1921, (G. N. Wolcott), from the U. S. National Museum. All of the above other than the type and allotype we consider paratypes. These specimens show no noteworthy differences from the descriptions given above. The allotypic female is recessive in coloration, as is also one of the other females, the third being of the intensive phase.

It is of interest to note, in connection with the relationship of this genus and the two species, that in the recessive type of female of the present species, the *Cariblatta* lyrate pronotal pattern is quite evident, thus pointing to affinity with that genus, as corroborated by features of the structure. Also in the recessive females we see evidence of paired diverging dark pronotal bars, which features are strongly marked in *C. instigator*.

Cariblattoides instigator,[1] new species

Plate III, Figures 6 to 9

TYPE.—Male; Guantanamo, Oriente Province, Cuba. (C. F. Ramsden.) [Academy of Natural Sciences of Philadelphia, Type No. 5359.]

Size small; form moderately depressed; surface of dorsum moderately polished.

Head in outline elongate subtrigonal; the eyes broadly rounded in outline; interspace between eyes equal to approximately one and a half times the greatest depth of eye; face moderately arcuate transversely, weakly so longitudinally: eyes subreniform in outline, narrowing ventrad; ocellar spots relatively large, slightly more distant than most approximate points of eye margins: antennæ elongate; maxillary palpi with distal joint subequal to fourth joint, moderately compressed, considerably inflated, regularly narrowing in distal two-thirds.

Pronotum with cephalic margin much narrower than caudal margin, lateral margins strongly arcuate convergent from point of greatest width of pronotum to their broadly arcuate point of juncture with cephalic margin; lateral hyaline portions broad, narrowing cephalad.

Tegmina surpassing apex of abdomen by about length of pronotum, narrow, subequal in width, distal two-thirds of costal and sutural margins subparallel; apex nearer costal margin, rounded acute-angulate, sutural margin in distal third obliquely arcuate to the apex: marginal field relatively narrow, elongate; scapular field slightly narrower than in *suave*, costal rami in scapular field numerous, oblique; discoidal sectors seven in number including main median vein and ulnar vein; anal field with five axillary veins. Wings with apex of anterior field rounded; nine costal veins and the mediastine vein strongly elongate clavate.

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[1] An instigator or stimulator, in allusion to the puzzling features of this and the allied species.

Supra-anal plate with margin obtuse-angulate, shallowly and very broadly V-emarginate mesad, margin of plate with a regular, spaced series of slightly deflected bristles: subgenital plate short, flattened ventrad and with lateral portions vertical, U-shaped in proximal section, distal margin with a short, median, rounded tubercle; styles closely placed on each side of median marginal tubercle, symmetrical, very short, thick, each on dorsal surface with a group of recurved, claw-like spines, directed mesad.

Cephalic femora with ventro-cephalic margin armed with two large, unequal, distal spines, then proximad a series of numerous, very short, closely placed, but thick and heavy, spinulations, following by a proximal group of four much more widely spaced, large spines.

General color of disk of pronotum, head, limbs, and dorsal and ventral surfaces of abdomen, warm buff, the dorsum of the abdomen weakly washed with raw umber, the venter of the same laterad with a curved line of raw umber and a bold spot of fuscous, the proximo-ventral segment weakly bordered with raw umber. Head with a broad interocular bar of deep chestnut-brown on the vertex; palpi distad clouded with raw umber; antennæ with distal five-sixths suffused with raw umber, deepening distad, proximal joint lineate with raw umber on external face; eyes blackish fuscous. Pronotum with the disk bordered laterad by a pair of broad, divergent, deep mummy brown bars, the margins of which are appreciably undulate; lateral portions of pronotum hyaline. Tegmina in general hyaline, with a slight buffy tinge, a broad continuation of the pronotal dark bar, in prout's brown, carried along the region of the humeral trunk, in the proximal half broad, solid and sharply defined, in the distal half weakened and spread, as a suffusion, over the greater portion of the discoidal field. Wings very faintly tinted with brownish, the veins pencilled with dresden brown, the costal margin with a relatively broad section involving all the clavate portions of the costal veins and a narrow border running to the base of the wing, opaque white. Cerci light buff, the proximal dorsal segment fuscous, the ventral segments each with a fuscous patch covering most of the segment. Limbs with the points of insertion of tibial spines marked with fuscous dots.

Length of body, 9 mm.; length of pronotum, 2.4; greatest width of pronotum, 3.5; greatest length of tegmen, 9.6; greatest width of tegmen, 2.7.

The type of this most interesting species is the only adult seen by us. It is unfortunate we are not acquainted with the adult female, as it would be interesting to know whether *instigator* displays as much sexual differentiation as *suave*.

We have before us five immature specimens, one male and four females, taken at Cabañas, Province of Pinar del Rio, Cuba, September 5–8, 1913, (Leng; siftings from under sea-grapes, other shrubs, and low trees), which are assignable to this species. The specimens represent at least three instars. The male shows simple, widely separated, short, rounded styles on the subgenital plate, with no suggestion of the peculiar type later acquired. Between these styles, mesad, is placed a small, shallow, broadly V-shaped emargination. The general colors of these specimens is similar to those of the adults; the dorsal surface bears a very characteristic color pattern, which roughly consists of paired dark lateral bars on the pronotum, as in the adult, these bars converging and connected cephalad, while they are continued caudad over the other thoracic segments and most of the abdomen, broken proximad on the metanotum, and broadly expanded and arcuate on the abdomen, converging and fusing on the sixth tergite. Mesad the pronotum, mesonotum and proximal portion of metanotum bear a pair of fine dark lines, more approximate on the pronotum and not reaching the cephalic margin of same. Abdomen with proximal tergite largely dark, second to fifth with a median oval dark area, connected with the transverse dark marking on the sixth tergite. Distal tergites edged laterad with dark. Head with interocular dark bar as in adult; face with three complete and one incomplete transverse arcuate bar lines, or these are represented solely by lateral dots.

NEOBLATTELLA Shelford

The present is one of the largest American genera of the Blattidæ· The great variety of species would seem to form apparently natural groups, which show marked developments along radiating lines, frequently closely approximating allied genera. The genus as now understood is of tropical American origin, and its diversity, particularly in features of the male sex, is extraordinary, so much so, in fact, that it may be necessary to divide it into a number of genera to properly express the relationship of the forms. To do this, however, or for that matter as definitely to prove such action unwarranted, will require the examination of a great number of species, and at this writing no collection in the world is sufficiently representative to warrant such a study. In the meantime we are referring to the aggregations of species as "groups," placing them about some one of the species, the name of which the group bears. But three of these groups are represented in the West Indies, and as far as known two are peculiar to that archipelago. The three are the *Nahua* Group, the *Detersa* Group and the *Lucubrans* Group. The first of these also occurs in Central and South America. The third is utilized here for four species concerning which our knowledge is limited, as we are not acquainted with the male sex of two of them, but all of which show certain features of affinity in the known sexes.

The males of *Neoblattella* show a most astonishing diversity of genitalic development, and in some groups the dorsal surface of the male abdomen is distinctly specialized. The females, however, show little or no response to the specialization found in the opposite sex, so that accurate specific determination is either impossible or can be made only after a most careful check up of other, and usually far less evident, features of difference. To weigh these properly a knowledge of the usual differences between the sexes is essential, while field knowledge is also of great value.

Nahua GROUP OF THE GENUS *Neoblattella*

Brunner in 1892[1] reported Stål's *Blatta adspersicollis* from St. Vincent, and later[2] from Grenada as well. We have been able to examine some of the material reported by him from each island. This not only does not represent *N. adspersicollis*, which we now know is not present in the West Indies, or even in northern South America, but in fact the material does not even belong to the *Adspersicollis* Group of the genus. The chief difference between the *Adspersicollis* Group and the *Nahua* Group is the absence in the former and presence in the latter of marked lateral specialization of the fifth tergite of the male.[3] It is evident that the Grenada and St. Vincent material seen by us represents an undescribed member of the *Nahua* Group.

The *Nahua* Group is now known to be composed of four species: i. e., *nahua* (Saussure), ranging from tropical Mexico to Panama; *aristonice* Hebard,[4] from French Guiana; *laodamia* Rehn and Hebard, here described from the Lesser Antilles, and *fraterna* (Saussure and Zehntner) ranging rom tropical Mexico to Panama. There exists no doubt in our minds that additional representatives of the group will be found in the humid tropical portions of northern South America, thus connecting the apparently separated distributional areas.

Neoblattella laodamia,[5] new species

Plate II, Figures 15 to 17

P [*hyllodromia*] *adspersicollis* BRUNNER, 1892, Proc. Zoöl. Soc. London, 1892· p. 202. St. Vincent, West Indies.

P [*hyllodromia*] *adspersicollis* BRUNNER, 1893, idem, 1893, p. 601. Grenada, West Indies.

More nearly related to *N. aristonice* Hebard, recently described from French Guiana,[6] differing most markedly in the less transverse, more trigono-trapezoidal pronotum, in the greater occipital interspace between eyes (♂), in the less produced (caudad) and less sharply reflexed lateral specialization of the fifth tergite, and in the more produced and linguiform supra-anal plate of the male, which is more decidedly emarginate at the apex. From the Central American *N. nahua* the present insect differs in the same features as it does from *N. aristonice*, and in addition in the more robust styles of the male subgenital plate, and in the caudal metatarsus in the male being twice as long as the remaining caudal joints (instead of one and one-half times as long as in *N. nahua*).

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[1] 1892, Proc. Zoöl. Soc. London, 1892, p. 202.
[2] 1893, Idem, 1893, p. 601.
[3] See Hebard, 1920, Mem. Amer. Entom. Soc., No. 4, p. 64.
[4] 1926, Proc. Acad. Nat. Sci. Phila., 1926, p. 170.
[5] From λᾱ̆οδάμεια, daughter of Bellerophon.
[6] *Loc. cit.*

Type.—Male; Windward side, St. Vincent, West Indies. (H. H. Smith.) [British Museum of Natural History.]

Size large (for genus); form as usual in the group; surface moderately polished.

Head moderately deplanate, subpyriform, somewhat deeper (about one-sixth) than greatest width across eyes; occiput and eye outline regularly arcuate; occipital interspace between eyes slightly less than occipital depth of eye, faintly more than half that between ocellar spots. Palpi elongate, slender; penultimate and antepenultimate joints subequal in length, the former virtually straight and subequal in width, the latter moderately infundibuliform; ultimate joint faintly more than two-thirds as long as the penultimate joint, shallow, moderately compressed.

Pronotum trigono-trapezoidal in outline, greatest length contained nearly one and one-third times in greatest width of same, which is at caudal third: cephalic margin strongly arcuate, passing into diverging, more gently arcuate lateral margins without a distinct angle; point of greatest width well rounded, the outline passing through short, oblique, subtruncate caudo-lateral sections, and a weak but appreciable angle to the weakly arcuate caudal margin: in transverse section a trigonal area made up of the caudal portion of disk and vicinity of caudal margin is deplanate, hyaline lateral areas and adjacent latero-cephalic portions of disk broadly and markedly declivent.

Tegmina surpassing apex of abdomen by length of pronotum, greatest width contained about three and one-half times in greatest length: costal margin well arcuate in proximal half, distal half straight, narrowly rounding to apex: marginal field relatively broad, reaching distad as far as apex of anal field: costal veins sixteen to seventeen in number (total number of rami in scapular field); discoidal rami eleven in number (including ulnar vein); axillary veins five in number. Wings with fourteen costal rami (exclusive of extreme distal rami of discoidal vein), these non-clavate; ulnar vein with five complete rami, the two distal of which are bifurcate: medio-discoidal and medio-ulnar areas narrow and subequal in width; intercalated triangle small.

Fifth abdominal tergite with distal margin truncate in median half of tergite, laterad the tergite develops into well-defined lobations, which are integral parts of the tergite but each well differentiated from its median section by an arcuate elevation, making the lobation virtually as long laterad as proximal breadth of same, projection distad of median section of margin a distance nearly equal to one-third the entire length of the lobe, external margin of lobes straight, slightly oblique, for a distance nearly equal to a third of proximal width of lobe bent obliquely dorso-laterad; surface of proximal section of these lobes bears a large ovate impression (mesad) and a small circular one (laterad). Sixth tergite with its distal margin bisigmoid, weakly elevated and subrostrate mesad. Surface of fourth, fifth and sixth tergites bearing a longitudinally disposed, semi-ovate depressed area mesad. Supra-anal plate trigonal produced, greatest width at base little greater than greatest median length, distinctly surpassing subgenital plate; converging margins of production concave, apex shallowly emarginate, laterad of same arcuate to concave lateral margins, the whole apex thus biarcuate; in transverse section the plate is strongly guttered by the dorsal flexure of the lateral sections. Cerci elongate, tapering, articles of moderate length, little evident proximad. Subgenital plate relatively short, transverse, margin as a whole arcuate; stylar fossæ small, separated by more than twice the length of the styles, the latter simple, subequal in width, apex bluntly rounded.

Caudal tarsi with metatarsus twice as long as remaining tarsal joints together, slender; metatarsus and succeeding tarsal joint biseriate spinulose ventrad; pulvilli large.

General color of dorsum clear yellow ocher, with a buckthorn brown tendency on the tegmina aside from marginal field; disk of pronotum with its base color between ochraceous-buff and zinc orange. Pronotal disk spots prout's brown, pattern consisting of a pair of median groups of three spots each, these roughly trigonal in shape; cephalad with an indefinite well-spaced pair followed by a more widely spaced pair, then a pair of spots laterad of central paired groups and at lateral boundaries of disk, and finally a closely placed caudal pair of spots. Base color of head, coxæ and limbs ochraceous-buff. Interocular region with band of cinnamon-brown; face with three pair of equally spaced dots of the same color, one interocellar, the next interantennal and the third pair equidistant between the second and the base of the clypeus; an accessory pair of less evident spots, more closely placed, occasionally (paratype) indicated between second and third pair of spots; dorsal and ventral margins of scrobes pencilled with dark; lateral margins of face, approximately on level of third pair of facial spots, and occasionally maxillary articulation marked with same color. Eyes between auburn and mummy brown. Dorsum of abdomen washed with mummy brown on an ochraceous base, less decidedly so proximad; venter of abdomen of a similar combination, but dark overlay irregularly clouded over proximal segments and on distal ones largely limited to lateral areas; subgenital plate in type margined distad with same dark color. Cerci largely washed with mummy brown.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, St. Vincent, type...	16	4.5	5.7	18.4	5 mm.
♂, Balthazar, Grenada, paratype............	14.2	3.8	4.9	16.5	4.2

In addition to the type we have examined a male from Balthazar (windward side), Grenada, taken by H. H. Smith, one of the originally reported series of Brunner, and belonging to the British Museum of Natural History. This we are considering a paratype. It is appreciably smaller than the type, but agrees fully in all essential features. The interstylar margin of the subgenital plate in the paratype is somewhat thickened on each side of median line.

The range of the species probably covers a considerable section of the Lesser Antilles, and it doubtless occurs in the islands intervening between the two from which we definitely know the insect. Whether it occurs to the northward of St. Vincent remains to be determined.

We have examined the following material from Dominica which represents a species of the *Adspersicollis* or *Nahua* Groups of the genus *Neoblattella*, but without adult males any attempt at definite reference, even to groups, would be hazardous.

Dominica.—Long Ditton, VI, 19, 1911, (F. E. Lutz), 2 ♀, 1 immature ♀. Roseau, VI, 22, 1911, (F. E. Lutz), 1 immature ♂.

It is quite certain, however, that this material represents a species very distinct from *N. laodamia*, described above. The pronotum is more semielliptical, more deplanate and with less evident points of greatest width; the marginal field of the tegmina is narrower, while the caudal metatarsus is proportionately somewhat shorter. The character of the subgenital plate and supra-anal plate of the immature male, which is in the instar preceding maturity, would indicate different types of structure from those known to occur in *laodamia*.

The *Detersa* Group of the Genus *Neoblattella*

In the West Indies we find a group of the genus *Neoblattella* which is, as far as known, autocthonous, although three species (*celeripes*, *tridens* and *detersa*) have been taken as adventive forms in the United States. In the Greater Antilles occur eleven species of this group, while in the Lesser Antilles it is represented by at least one species, but the relationship of this to the Greater Antillean forms is not definitely known, as we have no male individuals for study, and the differential characters in the group are very largely in the male genitalia.

The species known to belong to this group are *carcinus*, new species [Hispaniola], *vatia*, new species [Cuba], *eurydice*, new species [Jamaica], *proserpina*, new species [Jamaica], *celeripes*, new species [Jamaica], *tridens*, new species [Jamaica], *detersa* (Walker), [Jamaica], *semota*, new species [Jamaica], *adusta* (Caudell), [Porto Rico], *borinquenensis*, new species [Porto Rico] and *vomer*, new species [Porto Rico]. From this it will be seen that, as far as our present knowledge goes, the group reaches its maximum division in Jamaica, although its maximum differentiation might well be said to occur in Porto Rico, as one of the forms peculiar to that island (*adusta*) has one of the most complex genitalic structures and another (*vomer*) has the simplest in the group.

The Lesser Antilles females mentioned above have the following data.

Dominica.—Laudet, VI, 11, 1911, (R. W. Miner; under bushes), 1 ♀. Long Ditton, VI, 20, 1911, (Lutz; in short grass and weeds), 1 ♀.

These may represent *borinquenensis* or *adusta*, to which under any circumstances they are most closely related, but they are distinctly larger than the former, with the interspace between the eyes narrower and the pronotal disk weakly, sparsely and rather obscurely marked. The discoidal sectors are more numerous (10 to 11) than in *adusta*. Without accompanying males no further comment on these specimens seems desirable at this writing.

In order to assist in the recognition of the species of the *Detersa* Group we have constructed a key upon the male genitalic features. This will be found to function with satisfaction as far as males are concerned. It is virtually impossible to build a key which will be of service for identifying the female sex of the species. Having but few distinguishing features in the genitalia there is in that sex little in the way of readily appreciable characters which could be utilized in a key. The present table is purely artificial, made solely for service, and does not attempt to show phylogeny in the position of the species. The arrangement of the species in their individual treatment presents our ideas of their relationship as far as possible in a linear sequence.

Males

1. Subgenital plate with distal margin arcuately obtuse-angulate, no extra median or accessory lateral productions of margin. Styles normally hidden. [Cuba.] .... *vatia*, new species.

Subgenital plate variously developed, distal margin in general form acute-angulate, or with median or median and accessory productions, or in general form the plate is subrectangulate, trapeziform or subquadrate. Styles apparent .... 2.

2. Production of distal margin of subgenital plate as a whole and embracing all of interstylar area, acute trigonal produced, no accessory productions of this margin mesad of stylar fossæ. [Porto Rico.] .... *vomer*, new species.

Production of distal margin of subgenital plate variously developed, interstylar area never acute trigonal as a whole, this margin generally with interstylar accessory production of some type .... 3.

3. General form of subgenital plate subquadrate or trapeziform as seen from venter, length and breadth more nearly subequal, not transverse subrectangulate. No median production of distal margin of plate .... 4.

General form of subgenital plate transverse subrectangulate as seen from venter, distinctly broader than long without consideration of median production of distal margin, not subquadrate or trapeziform .... 5.

4. Supra-anal plate with distal margin entire. Lateral portions of subgenital plate distad of stylar bases thickened and supplied with stout spinulæ; styles rod-like, armed on disto-internal face with fine denticulations. [Porto Rico.] *adusta* (Caudell).

Supra-anal plate with distal margin shallowly obtuse-angulate emarginate mesad. Lateral portions of subgenital plate reflexed dorsad, not thickened or supplied with spinulæ; styles spiniform, tapering, non-denticulate. [Porto Rico.] .... *borinquenensis*, new species.

5. Distal margin of subgenital plate mesad obtusely trigonal produced, never with a falciform or similar development .... 6.

Distal margin of subgenital plate mesad produced into a structure of varied form—subfalciform, digitiform or linguiform .... 8.

6. Supra-anal plate with distal margin distinctly emarginate mesad. Median section of distal margin of subgenital plate broadly obtuse trigonal with the immediate apex emarginate; a pair of accessory juxtastylar appendages of margin sublamellate and folded on themselves in a sigmoid fashion. [Hispaniola.] .... *carcinus*, new species.

Supra-anal plate with distal margin either entire or very faintly subemarginate. Median section of distal margin of subgenital plate with a smaller median trigonal production, with or without flanking lobulations of the same margin, apex of median production never emarginate and accessory appendages of margin never folded .... 7.

7. Form as usual in genus, pronotum not proportionately larger and tegmina and wings markedly surpassing apex of abdomen. Supra-anal plate with margin very faintly emarginate mesad. General form of distal margin of subgenital plate transversely truncate with a median trigonal production, no lateral accessory lobulations present. [Jamaica.] .... *eurydice*, new species.

Form proportionately robust for genus, pronotum markedly larger and heavier, tegmina and wings more corneous than usual, but slightly surpassing apex of abdomen. Supra-anal plate with margin entire. Distal margin of subgenital plate with a larger median trigonal and pair of lower rounded productions at the lateral angles, the margins of all of which bear distinct spines. [Jamaica.] .... *proserpina*, new species.

8. Supra-anal plate with margin entire. Median production of distal margin of subgenital plate greatly developed, slender, subfalciform, compressed mesad, subclavate distad; no lateral accessory developments on margin. (Marked interocular bar and accompanying transverse bar on upper face present.) [Jamaica.] .... *semota*, new species.

Supra-anal plate with median emargination. Median production of distal margin of subgenital plate never falciform, either linguiform or digitiform; lateral accessory developments on margin indicated .... 9.

9. Median production of distal margin of subgenital plate linguiform, in profile decurved distad, its dorsal surface with shagreenous spiniform teeth. Interocular region and dorsal section of face without sharply defined transverse dark bars. [Jamaica.] .... *detersa* (Walker).

Median production of distal margin of subgenital plate digitiform, subcylindrical, without shagreenous teeth, apex rounded. Interocular region and dorsal section of face with a distinct interocular dark bar and at least indications of a similar one on face .... 10.

10. Distal margin of subgenital plate, except for median digitiform production, subtruncate transversely, lateral portions of margin rounded rectangulate with a few shagreenous teeth. Dark transverse bar on dorsal section of face not strongly marked. [Jamaica.] .... *celeripes*, new species.

Distal margin of subgenital plate tridigitate, caudo-lateral angles of plate produced into diverging structures similar to the median productions, but broader, intervening sections of distal margin oblique. Dark transverse bar on dorsal section of face well marked but broken mesad. [Jamaica.] *tridens*, new species.

Neoblattella carcinus,[1] new species

Plate III, Figures 10 to 13

This species is a relative of *N. vatia*, but the striking features of the male genitalia are exceedingly characteristic and will prove of the greatest value in that sex in the recognition of the species. There is also a marked suggestion of *detersa* in the male sex, but the relationship there is by no means as close. The females are far more difficult to distinguish, but the size is smaller in *detersa* and larger in *vomer* and *eurydice*. In addition the cerci in *carcinus* are not as strongly marked ventrad with dark fuscous as in *detersa*, and the whole abdominal coloration is not as contrasted. In *vatia* the female subgenital plate has no appreciable ventral medio-longitudinal sulcus distad, that is present in the other related forms except *proserpina*, which has a most characteristic heavy build.

TYPE.—Male; "St. Domingo" [Dominican Republic], Hispaniola. June 8, 1905. (A. Busck.) [United States National Museum.]

Size medium; form as usual in group.

Head sub-pyriform, about one and one-seventh as deep as greatest width across eyes, infra-ocular portion of head appreciably narrower than ocular width. Interocular space at occiput equal to but slightly more than the occipital depth of eye, slightly greater than two-thirds the width between ocellar spots. Eyes prominent, when seen in cephalic aspect, bullate, extending ventrad not quite as far as ventral margin of antennal scrobes.

Pronotum transverse ovate, greatest length contained one and one-third times in greatest width of same, which is slightly caudad of middle: cephalic margin very weakly arcuate, without evident angle rounding into the arcuate diverging lateral margins, these passing regularly to the broadly rounded point of greatest width, whence the lateral margins are more strongly arcuate convergent to rounded, but more evident, caudo-lateral angles; caudal margin very faintly oblique-angulate: surface subdeplanate, very weakly declivent laterad.

Tegmina and wings surpassing apex of abdomen by more than the pronotal length. Tegmina elongate lanceolate, greatest width contained nearly four times in greatest length: costal margin appreciably arcuate in proximal half, thence straight and lastly rather briefly rounding to apex; sutural margin largely straight, distad obliquely arcuate to apex: marginal field short and relatively broad; scapular field broad, mesad occupying half of tegminal width; anal field occupying about three-eighths of total tegminal length, pyriform: costal veins (total venation of scapular field) fourteen to fifteen in number; discoidal sectors (including ulnar vein) eight to nine in number; six axillary veins.

Supra-anal plate strongly transverse, margin arcuate, mesad finely and rather broadly rectangulate emarginate. Cerci damaged. Subgenital plate complex, slightly asymmetrical, the distal margin mesad broadly angulate with the apex weakly emarginate and flanked laterad by small, very low, rounded lobes; at the lateral angles of the plate are developed the paired, elongate, converging, hinged styles, which taper distad and are subdeplanate proximad on their extensor surface, their apex dorsad, acute and accompanied a short distance ventrad by a distinct spine: placed mesad of the styles the margin of the plate is developed into equal sublamellate structures, folded on themselves in a sigmoid flexure, distad with a pair of spines; genital hook elongate, of the usual recurved type, the apex weakly bulbous.

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[1] From *καρκίνος*, a crab or a pair of tongs, in allusion to the structure of the subgenital plate of the male.

Limb spination as usual in group. Caudal tarsi damaged.

Allotype.—Female; San Francisco Mountains, thirteen kilometers north of San Cristobal,[1] Province of Santo Domingo, Dominican Republic, Hispaniola. September, 1905. (A. Busck.) [United States National Museum.]

Differing from the male sex in the following noteworthy features.

Interspace between eyes at occiput about half again as great as occipital depth of eye.

Supra-anal plate moderately transverse, distinctly trigonal, the converging margins very faintly arcuate-emarginate, the apex as a whole rather narrowly enclosing the fissure.[2] Cerci very elongate, subfusiform, greatly tapering distad, the joints of distal four-fifths quite elongate and largely moniliform; apex very acute: dorsal surface of cerci deplanate, rounded beneath, segments individually subtumid. Subgenital plate very large, scoop-shaped, narrowing distad and there compressed, the apex narrow, the ventral surface in that region with a brief but appreciable median sulcation.

General color between ochraceous-buff and ochraceous-orange, distad the tibiæ and tarsi are washed weakly with ferruginous. Interocular portion of occiput, dorsal section of face and ocellar spots in male washed with ferruginous,[3] of female with a pale fuscous interocular bar and the face has three weak cross-bars, the dorsal one roughly W-shaped on ventral margin; eyes cinnamon-brown. Pronotum with lateral sections hyaline, tinted with general color, opaque disk in type with a median pair of circular dots of pale mummy brown, cephalad weak intimations of a more spaced pair; from this type we find certain females varying in the absence of the cephalic intimations and possessing extra comma-like dashes and supplementary dots laterad of the central pair, one pair of dots at lateral margins of disk. Venter of abdomen with pale lateral edgings of light buff, within which on each segment is a cloud of prout's brown, the stigmatic spot a sharply defined dot of the same color.

Measurements

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen
♂, "Dominican Republic," type..	11.3	3.3	4.5	14.2mm.
♀, Sanchez, Dominican Republic, paratype......................	10.8	3.5	4.7	12.2
♀, San Francisco, Mountains, Dominican Republic, allotype...	12.7	3.6	4.5	14.3

In addition to the type of this peculiar species, which is apparently limited in distribution to Hispaniola, we have before us two paratypic females bearing the following data.

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[1] See page 11, footnote 1.

[2] This is as figured in the San Francisco Mountains specimen. In the Sanchez female there is no fissure and the margin is entire. The plate in the latter is, however, quite translucent in that region and the closing may be merely that of a membrane, although this may be a feature of individual variation or we may possibly have two species in the females. We do not, however, incline toward the latter view.

[3] The condition in the male is probably due, in part at least, to discoloration.

Sanchez, Province of Samaná, Dominican Republic, Hispaniola, May 22–27, 1915, (Watson; west of town), 1 ♀.

Blanton Mine,[1] north of San Cristobal, Santo Domingo Province, Dominican Republic, Hispaniola, July 26, 1917, (H. Morrison), 1 ♀, [U. S. N. M.].

Neoblattella vatia,[2] new species[3]

Plate V, Figures 1 to 6

A very distinct member of the *Detersa* Group, chiefly characterized by the structure of the styles of the male subgenital plate, which are widely separated, recurved hook-like structures with a sharp apex, the margin of the subgenital plate between the styles being broadly arcuate. The supra-anal plate of the male is of a simple, broad, transverse type, with the margin relatively regularly arcuate. The structure of the male genitalia readily distinguishes this species from the allied forms. Some comparative notes on the female subgenital plate of the species are given under *detersa*.

Type.—Male; Cuba. (Ch. Wright.) [Museum of Comparative Zoölogy.]

Size large (for the group, of which it is one of the largest species); form as usual in the genus, depressed; surface moderately polished.

Head of type badly damaged,[4] of paratypes, narrowly projecting cephalad of pronotum, occipital outline with eyes weakly arcuate, with occipital interspace between eyes slightly narrower than supra-ocellar depth of eye, nearly twice as wide as that between ocellar spots. Lateral costæ of head ventro-caudad of eyes faintly convergent, nearly parallel. Palpi relatively slender; third joint straight, subequal; fourth joint slightly shorter than the third joint, weakly infundibuliform; fifth joint slightly shorter than the fourth, moderately inflated, subdepressed, the apex rounded from the dorsum, moderately acute when seen from side. Eyes weakly projecting laterad, in basal outline broad subreniform, narrowed ventro-caudad. Antennæ elongate; proximal joint large, moderately inflated; third joint elongate, but little shorter than proximal joint.

Pronotum short sub-trapeziform ovate, moderately transverse, the greatest length contained one and three-tenth times in the greatest width, the axis of the latter appreciably caudad of middle of pronotum; cephalic margin of pronotum moderately arcuate, regularly passing laterad into the oblique, caudad diverging, weakly arcuate lateral margins, the point of greatest width strongly and regularly rounding to the caudo-lateral angles, which are evident but slight; caudal margin of pronotum weakly and very broadly angulate arcuate. Surface of disk of pronotum without oblique impressions; lateral portions broad, appreciably but not strongly deflexed, the disk very weakly arcuate in transverse section.

Tegmina elongate lanceolate, surpassing the apex of abdomen by the length of pronotum, greatest width contained slightly more than three and one-third times in greatest length of same, in general subequal in width: costal margin well arcuate proximad, nearly straight in greater part of the region of the scapular field, distad rather strongly rounding to the slightly obtuse, but very evident, apex, which is but faintly rounded and is slightly nearer the costal than the sutural margin; sutural margin largely straight, distad broadly rounding to the apex. Marginal field of tegmen moderately broad, elongate; scapular field relatively broad, greatest width one-half that of tegmen at point in line with apex of anal field, narrowing appreciably distad; anal field very elongate pyriform, the apex not appreciably blunted, costal veins of tegmina strongly longitudinally oblique, diverging from the discoidal vein at very acute angles, a number of those distad are bifurcate: discoidal sectors longitudinal, ten to twelve in number including ulnar vein and the longer furcations of some of the ulnar rami; axillary veins of tegmina six in number. Wing with apex rounded acute-angulate: costal margin of wing with region of the costal vein very faintly arcuate; intercalated triangle distinct but small. Costal veins of wing, including mediastine vein, ten to eleven in number, strongly oblique, the proximal five or six very elongate clavate briefly before apex: medio-discoidal area virtually subequal in width to medio-ulnar area, former with numerous transverse cross-veins forming oblong or quadrate areolets: ulnar vein with four to five complete rami, several of which are bifurcate; axillary vein with three rami diverging on the side toward the anal vein, the two longer ones bifurcate.

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[1] The Blanton Copper Mine is very near Naranja Dulce and in the hills called "San Francisco Mountains" by Busck.

[2] Bent inwards, in allusion to the styles.

[3] This is probably the species recorded by Bolivar (1887, Mém. Soc. Zool. France, I, p. 123) as *Blatta adspersicollis*, from Guantanamo. This latter is a South American species, and does not, as far as we know, occur in the West Indies.

[4] The type, the only male available when the description and figures were prepared, is badly damaged, lacking most of the head, cerci and most of the legs. Where we are unable to give features of these parts from the type, we are giving those found in the paratypic males from Cotorro, Cuba.

Dorsum of abdomen unspecialized.[1] Supra-anal plate transverse, arcuate subtrigonal, cercal emargination marked, surface largely deplanate, lateral portions of margins weakly elevated. Cerci damaged. Subgenital plate complex, moderately transverse, the plate proper embracing the bases of the processes laterad, surface moderately elevated or impressed with a slight, lip-like recurvature of the margin meso-distad; distal margin much like that of supra-anal plate in shape, with a weak median thickening and labiation: styles lateral, briefly mesad of the accessory processes in position, depressed and lying subparallel to the general plane of the plate, diverging, short, the tip bearing a strong spine: accessory processes placed in the distinct lateral embrasures of the margin of the plate, developed as hinged, mesad directed, sigmoid and strongly recurved hooks, in their length subequal to one-third the length of plate between their bases, very thick proximad, with a flange-like carina, narrowing distad and with the distal recurvature pronounced and with a decided apical claw-like spine, the whole structure exhibiting considerable tortion.

Cephalic femora with ventro-cephalic margin bearing "Type A" spination, the spines all being equal in form and relatively large, but decreasing in size distad, the proximal ones quite long; apical group of large spines on same margin two in number, the distal the longer: ventro-caudal margin with four spines in distal two-thirds. Median and caudal femora each with dorso-genicular spines; ventral margins well spined; caudal tibiæ elongate. Caudal tarsi very slender and elongate: caudal metatarsus equal to five-eighths of entire tarsal length; ventral surface of caudal metatarsus and second and third joints biseriate spinose; pulvilli on all tarsal joints except apical one, distal, trigonal and relatively small on all but fourth, on which the pulvillus takes up all the ventral surface; arolia present; tarsal claws with lamella serrulate on margin.

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[1] This surface is considerably damaged, and of the median segment largely destroyed, in the type male. The male paratypes are appreciably shrivelled, but no pronounced specialization is evident.

ALLOTYPE.—Female; Baños de San Vincente, seven kilometers north of Viñales, Province of Pinar del Rio, Cuba. September 16–22, 1913. (Lutz; on bananas.) [American Museum of Natural History.]

Differing from the type in the following features.[1]

Head with least occipital interspace between eyes relatively narrow, not greater than the occipital dorso-ventral depth of eye, the interocellar width one and one-half times that between eyes.

Supra-anal plate transverse trigonal, the lateral portions of the margin weakly arcuate-emarginate, the apex of the plate arcuate with a sharply-cut V-shaped fissation. Cerci damaged and incomplete. Subgenital plate large, moderately compressed and subrostrate distad, moderately produced and narrowing from the cercal emarginations, which are slight, the apex narrowly subtruncate; ventral surface of distal section of plate without a median sulcus.

General dorsal coloration pale raw sienna, on the dorsum of the abdomen passing to antimony yellow with the tergites margined distad and disto-laterad with fuscous, this most decided on distal half of abdomen, the supra-anal plate also largely and the cercal bases considerably fuscous. Ventral surface and limbs largely antimony yellow; ventral surface of the abdomen, in the male, laterad with areas of weak fuscous and more distinct, but smaller, gland spot patches, also an irregularly defined but extensive washing of the subgenital plate with mummy brown. Interocular and interocellar region with a large auburn patch, which has a spot of the general face color in its center and which may extend over the occiput in four fine dotted lines, the central pair closely placed, the others laterad: eyes bister: palpi with five joints weakly washed with fuscous: antennæ washed with vandyke brown, strongly so distad, the proximal and third joint blotched with same. Pronotum with disk opaque raw sienna with a pattern of fuscous dots; one pair caudo-mesad, a median pair of irregular figures made up by fusion of spots of about three parts each, paired small spots each placed at external borders of disk and a similar pair placed cephalad of the irregular figures: lateral portions of pronotum semi-transparent. Tegmina with marginal field slightly more clear hyaline than remainder of tegmina. Wings with veins pencilled in bister, the enlarged portions of costal veins approaching vinaceous-rufous. Tibiæ with extensor surface much marked with mummy brown, heavier distad; femora with similar markings pronounced on ventral margins of caudal femora and less extensive but evident on median femora, the markings placed mainly at spine bases.

Male (type).—Length of body, 13.7 mm. (head lacking); length of pronotum, 3.5; greatest width of pronotum, 4.6; length of tegmen, 15.2; greatest width of tegmen, 4.5.

Female (allotype).—Length of body, 13.5 mm.; length of pronotum, 3.9; greatest width of pronotum, 5; length of tegmen (damaged, with apex incomplete); greatest width of tegmen, 4.5.

In addition to the type and allotype we have before us two male and one female paratypes, taken at Cotorro, Havana Province, Cuba, by José Cabrera, and from the collection of the Academy of Natural Sciences of Philadelphia. These specimens were received subsequent to the preparation of the description and figures of this species, and in consequence we have used them merely to elaborate the descriptions already prepared. No essential differences from the described specimens have been noted in the Cotorro individuals.

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[1] Certain parts of the body, which are lacking or damaged in the male type, are here described as seen in the female.

Neoblattella eurydice,[1] new species

Plate IV, Figures 1 to 4

This relatively large species possesses a markedly distinctive male subgenital plate, the distal margin of which is transversely truncate with a median trigonal production, the styles placed in the lateral terminations of converging stylar grooves. The interocular space is narrow in the male sex, distinctly narrower than the occipital depth of the eye, and that area and the interocellar and interantennal region has no decided markings, but is washed with rufescent.

TYPE.—Male; between Pleasant Hill and St. Helens Gap, Blue Mountains, Jamaica. Elevation, 4400–4780 feet. July 24, 1923. (Rehn; from bromeliads.) [Academy of Natural Sciences of Philadelphia, Type No. 5409.]

Size medium (for genus); form and surface as usual in genus.

Head, when viewed from dorsum, visible cephalad of pronotum for nearly the full width of the head; seen in cephalic aspect, subpyriform in outline, slightly deeper than greatest width across eye: interspace between eyes narrow, not more than two-thirds as great as occipital depth of eye; interspace between ocellar spots slightly more than twice as great as interocular space. Palpi moderately elongate, ultimate joint slightly more than three-fifths as long as penultimate joint, latter appreciably infundibuliform, faintly sinuate proximad, antepenultimate joint slightly longer than penultimate joint, faintly sinuate.

Pronotum of the type usual in genus, ovoid-trapezoidal in outline, point of greatest width moderately caudad of middle, greatest length contained about one and two-fifths times in greatest pronotal width; lateral hyaline areas broad, moderately deflexed.

Tegmina and wings very ample, surpassing apex of abdomen by nearly twice the pronotal length: tegmina with marginal field relatively broad; scapular field very broad, at middle of tegmen occupying fully one-half of entire tegminal width; anal field elongate pyriform, with six to seven axillary veins.

Supra-anal plate of male transverse, arcuato-trigonal, apex very faintly emarginate. Subgenital plate in general form roughly transverse quadrate, lateral borders of plate, as seen from venter, subparallel, lateral portions of plate incurved dorsad of stylar sockets and not evident from venter; distal margin as a whole transversely truncate with a median trigonal production, which occupies about one-third of entire width of distal margin, laterad this margin is obliquely emarginate to base of styles; ventral surface of plate shallowly concave mesad, elevating laterad to the stylar bases, where a series of chætæ are distributed on ventral and external margins of sockets; extending mesad across ventral face of plate from stylar sockets proximad of and ventrad of the truncate and trigonal sections of distal margin is situated a pair of stylar grooves or channels, deepest laterad, becoming narrower and shallower toward median line; dorsal surface of trigonal section of distal margin with several short but evident conical teeth near apex; styles elongate, equal to one-half distance between their bases, tapering, subcompressed proximad, virtually subequal in width in distal third, faintly bent-arcuate slightly proximad of middle, apex with a group of pronounced chætæ.

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[1] From Eurydice's sojourn in Hades, in allusion to these insects hiding in the dark recesses of bromeliad clusters.

Caudal tibiæ very elongate, metatarsus a third longer than the remaining tarsal joints together; metatarsus, except for dorsum of proximal section, and second and third tarsal joints appreciably compressed, biseriately spinose ventral surface of metatarsus and of second tarsal joints very narrow. Tarsal claws ventrad with a marked pre-apical notch, marginal denticulations pronounced, increasing in size distad to notch.

Allotype.—Female; same data as type. [Academy of Natural Sciences of Philadelphia.]

Differing from the above description of the male (type) in the following noteworthy features.

Interspace between eyes broader, subequal to occipital depth of eye; interspace between ocellar spots equal to one and one-half time interocular space.

Tegmina and wings surpassing apex of abdomen by a distance about equal to length of pronotum.

Supra-anal plate trigonal in form, apex with a small, circular emargination, which is broader at its middle than the marginal aperture. Subgenital plate large, moderately compressed rostrate distad, infracercal sections of sides of plate appreciably inbent; lateral margins distinctly cingulate from base to half-way between cercus and apex; ventral surface of distal section subdeplanate with indications of a medio-longitudinal sulcation in that area; apex relatively narrow, faintly arcuato-emarginate.

General base color clear ochraceous-buff, pronotal disk with base color more cinnamon-buff. Occiput, interocular space and inter-ocellar region unmarked cinnamon-rufous, gradually passing ventrad into the base color of the face; eyes mummy brown to fuscous. Pronotal disk with an indefinite pattern represented by a pair of closely placed mummy brown small dots caudad; a median, less definite pair of more widely separated, generally larger spots and a pair of nebulous, similarly tinted areas cephalad, which latter may be subobsolete: caudal margin of pronotum pencilled with vinaceous-rufous, of variable intensity. Marginal field and portion of scapular field of tegmina, and lateral areas of pronotum, hyaline: proximal section of humeral trunk and of mediastine vein lined with vinaceous-rufous, variable in intensity. Venter of male sometimes faintly washed distad with cinnamon-rufous (type), in that sex with a fine medio-longitudinal mummy brown line on proximal segments and less definite lateral marginal darkening on all segments; in female similar dark markings are indicated, median less evident, lateral subobsolete proximad but becoming decided distad and more than distal half of subgenital plate nearly solidly dark mummy brown. Cerci transversely barred on ventral surface of each joint with mummy brown. Femora frequently washed with cinnamon-rufous proximad; vicinity of spine bases on cephalic femora and on median and caudal femora, also the ventral margins, very largely marked with mummy brown.

Male (type).—Length of body, 13 mm.; length of pronotum, 3.4; greatest width of pronotum, 4.5[1]; length of tegmen, 16.2; greatest of tegmen, 5.

Female (allotype).—Length of body, 14.7 mm.; length of pronotum, 3.8; greatest width of pronotum, 5; length of tegmen, 15; greatest width of tegmen, 4.3.

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[1] The type has one side of the pronotum damaged, and this dimension is from the paratypic male which is of similar bulk.

We have before us in addition to the type and allotype, a male bearing the same data as these, and a female from the same locality and environment but taken July 22, 1923; these additional specimens we consider paratypes. Two females taken by Max Kisliuk, May 8, 1922, from the fruit steamer 'St. Mary,' at Philadelphia, in from Bowden, Jamaica, we are referring provisionally to *eurydice*. The exact locality for the latter material is, of course, uncertain. These two specimens show no noteworthy differences from the typical series except that the interocular region has a bar of rufescent brown, which is unindicated in the typical material. Without accompanying males we would prefer to place this material here as provisionally associated.

Seven immature individuals clearly referable to this species are before us, all taken by Rehn in the Blue Mountains. These are one male, same data as type; one male and two females, Morces Gap, 4980 feet, July 29 and 30, 1923; one male, one female, New Haven Gap, 5600 feet, July 26, 1923; one female, west slope of Sir John Peter Grant Peak, 5700 feet, July 26, 1923. Of these all except two from Morces Gap, taken July 29, are in the instar preceding maturity, these exceptions being in the second one preceding maturity.

This information gives the species a vertical range of from at least 4400 feet to 5700 feet.

The Blue Mountains series was taken from bromeliads in the mountain forest, those secured on July 24 all being from bromeliads on several trees at the junction of the Pleasant Hill and Clydesdale-Cinchona trails. Individuals were moderately active, but not as much so as those of *detersa* and *semota*. They hid quite deeply in the bromeliads and were dislodged only by most vigorous shaking of the detached plant in the beating net.

Neoblattella proserpina,[1] new species

Plate IV, Figures 5 to 6

A species of rather large size and distinctive appearance, related on one hand to *eurydice* and on the other to *celeripes*, *tridens* and *detersa*, probably somewhat more closely allied to the first mentioned species than to the others. The heavy build, tegmina hardly (♀) or but little (♂) surpassing the apex of the abdomen, and the male genitalia are sufficiently diagnostic to assure ready recognition of the species. The subgenital plate of the male shares certain features with *eurydice*, i. e., the general contour of the ventral surface, the character of the styles, and the trigonal median production of the distal margin of the plate. The latter margin, however, shows marked differences in that the median production is subrostrate, weakly decurved and its margins have spaced spines; while the lateral sections of the distal margin are moderately produced and rounded, with spination as on the median production.

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[1] Proserpina, queen of the lower world, in allusion to the secretive habits of these bromeliadicolous insects.

TYPE.—Male; between Pleasant Hill and St. Helens Gap, Blue Mountains, Jamaica. Elevation, 4400–4780 feet. July 24, 1923. (Rehn; from bromeliads.) [Academy of Natural Sciences of Philadelphia, Type No. 5411.]

Size moderately large (i. e., body bulk); form apparently robust, but this is due to tegminal proportions; surface polished, with tegminal venation less elevated than in other species of the *Detersa* Group.

Head almost completely hidden beneath pronotum, at most but very slightly visible cephalad of pronotum when seen from dorsum; in cephalic aspect the outline of head is pyriform, slightly wider across eyes than deep: occipital interspace between eyes with its least width subequal to occipital depth of eye; interspace between ocellar spots about one and one-half times the interocular space. Palpi as in *N. eurydice.*

Pronotum more rectangulate trapezoidal than in *N. eurydice;* greatest length equal to four-fifths of greatest width, which is faintly caudad of caudal third: cephalic margin weakly arcuate, laterad regularly passing into the gently arcuate and moderately oblique lateral margins, which diverge less decidedly caudad to point of greatest width than in *N. eurydice;* caudo-lateral angles broadly rounded; caudal margin transverse, subtruncate, very faintly and broadly concave laterad of a but slightly more evident median production; in transverse section pronotum is more vaulted than in *N. eurydice,* lateral portions somewhat more declivent.

Tegmina and wings surpassing apex of abdomen by a distance equal to less than half of pronotal length. Greatest width of tegmen at middle, equal to about one-third of length of same: costal margin regularly arcuate; sutural margin in general straight, apex narrowed and rounded: marginal field broad, relatively short, at least as far as its more ample section is concerned; scapular field very broad, at middle of tegmen occupying faintly more than half of tegminal width; anal sulcus reaching to middle of tegmen, anal field elongate pyriform: venation of tegmina evident but less indicated by surface contour than in most species of the genus; discoidal sectors proportionately fewer than usual, the discoidal field being relatively restricted, about seven in number; axillary veins five to six in number.

Supra-anal plate of male transverse, distal margin regularly arcuate, no median emargination. Subgenital plate of male with general structure, form and contour very similar to that of *N. eurydice,* distal margin with a very pronounced median trigonal production and a pair of lateral, much lower, roundly obtuse-angulate shoulders; median production subrostrate, weakly decurved distad, its dorsal surface and lateral margins with distinct, spaced spines; lateral shoulders with similar spaced spines on dorsal surface and margin, those on latter recurved toward median line; styles much as in *N. eurydice;* stylar grooves of ventral surface less sharply marked.

Limbs robust, the tarsi particularly heavier and deeper than in *N. eurydice;* caudal metatarsus about a fifth longer than remaining tarsal joints. Tarsal claw specialization as in *N. eurydice.*

ALLOTYPE.—Female; same data as type. [Academy of Natural Sciences of Philadelphia.]

Differing from the above description of the male (type) in the following noteworthy features.

Interspace between eyes broader, about one and one-fifth times as wide as occipital depth of eye; interspace between ocellar spots equal to one and three-fifths times the interocular space.

Pronotum faintly larger in proportion; caudal margin mesad more truly truncate.

Tegmina and wings hardly surpassing apex of abdomen.

Supra-anal plate of female as in *N. eurydice*. Subgenital plate of female large, in general outline trigonal, but little compressed and very weakly rostrate distad, infra-cercal emarginations very weak, cingulation of lateral margins indicated but not pronounced from bases to shortly proximad of apex, latter narrowly rounded, entire, no disto-ventral sulcation.

General base color ochraceous-buff to dull zinc orange, hyaline lateral portions of pronotum, marginal field and adjacent scapular region of tegmina tinted with ochraceous. Occiput washed with pale orange-rufous to russet, this becoming obsolete in the inter-antennal region and with weak intimations of an enclosed transverse pale area between ocellar spots; eyes mars brown to fuscous; antennæ distad of proximal joint washed with tawny to mars brown. Pronotal disk with a pair of closely placed dark spots caudad and a median pair of more separated dots in all, in the more intensive individuals the median section has a number of extra paired dark dots, certain of which coalesce with the more persistent median pair of dots. Tegmina with proximal section of humeral trunk clouded with cinnamon-brown, in the intensive individuals the anal sulcus is pencilled with the same. Venter of abdomen colored essentially as in *N. eurydice*. Limb coloration much as in same species, varying in evidence with degree of pattern depth.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Between Pleasant Hill and St. Helens Gap, Jamaica, type..	13.8	4	5	12.2	3.8 mm.
♂, Between Pleasant Hill and St. Helens Gap, Jamaica, paratype................	14.5	4.1	5.5	12.6	4
♀, Between Pleasant Hill and St. Helens Gap, Jamaica, allotype................	15	4.4	5.6	12	3.8
♀, Morces Gap, Jamaica, paratype....	13.9	3.9	5.1	11.4	3.6

There is but little size variation in the adults before us, the specimens measured above representing the extremes of the series.

In addition to the type and allotype we have before us seven adults and three immature specimens from the same region, all taken by the senior author. These are as follows.

Between Pleasant Hill and St. Helens Gap, 4400–4780 feet, July 22 and 23, 1923, two males. Morces Gap, 4980 feet, July 19, 29 and 30, 1923, two males, three females, two immature males and one immature female. The adult specimens we are considering paratypes.

The species is quite uniform in character, except for a few features. The male supra-anal plate may be broadly and very shallowly emarginate distad; the male subgenital plate may show some variation in the exact shape of the lateral productions of the distal margin; the tegmina and wings in the female may fall faintly short of reaching the apex of the abdomen; the coloration may by a more intensive condition acquire an extra number of punctulations on the pronotal disk.

All of the specimens secured were taken from epiphytic bromeliads in the mountain forest, except one male from Morces Gap, taken July 30, which was found hiding under the bark of a huckleberry tree (*Vaccinium meridionale*). In the bromeliads it occurred in company with *N. eurydice* and *dryas*, here described. The type and allotype were secured from the same bromeliads which yielded the type and allotype of *N. eurydice*, on trees at the junction of the Pleasant Hill and Clydesdale-Cinchona trails.

Neoblattella celeripes,[1] new species

Plate IV, Figures 8 to 9

A near relative of *N. detersa*, but of larger size, with a distinctly patterned interocular and interocellar region, also having the male subgenital plate transversely truncate distad with a narrow, digitiform median production, which lacks the shagreenous spine covering of the process found in *detersa*, while the position of the styles, their general form, the form of the distal margin and the sculpture of the venter of the plate suggest *N. eurydice* and *proserpina*, but from which the form of the production is a decided departure. Comparison is made with *N. tridens* under that species.

TYPE.—Male; taken from S. S. 'St. Mary,' at Philadelphia, with fruit from Bowden, Jamaica.[2] May 8, 1922. (M. Kisliuk.) [Academy of Natural Sciences of Philadelphia, Type No. 5412.]

Size medium (for genus); form and surface as in *N. eurydice* and other allies.

Head when seen from dorsum narrowly visible cephalad of pronotum for greater portion of head width; seen in cephalic aspect pyriform as in allies, slightly deeper than greatest width across eyes; occipital interspace between eyes relatively narrow, but slightly greater than half of occipital depth of eye. Palpi less elongate than in *N. eurydice* and *proserpina*, penultimate and antepenultimate joints less elongate, ultimate joint three-fourths as long as penultimate.

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[1] In allusion to the swiftness of foot of the species of this group.

[2] We cannot give more definitely the source of the fruit in which this material was sheltered. It is very probable, however, that it was raised in the territory within a reasonable radius of Morant Bay, on which Bowden is situated. We may tentatively consider this species one of the lower country of southeastern Jamaica, i.e., that portion along the south coast east of Kingston.

Pronotum essentially as in *N. eurydice.* Tegmina and wings very ample, surpassing apex of abdomen by nearly twice the pronotal length; tegminal character as in *N. eurydice.*

Supra-anal plate of male much as in *N. eurydice.* Subgenital plate of male in general form roughly transverse rectangulate; lateral sections of plate vertical, rounding into ventral surface of plate, caudal margin of lateral sections obliquely truncate to base of style; distal margin of plate transversely subtruncate, lateral angles rather abruptly arcuate rectangulate to dorsal portion of stylar fossæ; median production of distal margin digitiform, narrow, subequal in width, not decurved distad, its dorsal surface arcuate distad when seen in profile, a few scattered spines disto-dorsad but no shagreenous covering indicated; lateral angles of distal margin with a few scattered teeth: ventral surface of plate with its general contour much as in *N. eurydice,* stylar grooves evident, converging, placed near distal margin: styles much as in *eurydice* but somewhat slenderer, more decurved distad.

Caudal tibiæ moderately elongate, somewhat less compressed than in *N. eurydice;* metatarsus nearly twice as long as remaining tarsal joints together, biseriately spinose, ventral surface of metatarsus slightly wider than in *N. eurydice.* Tarsal claws as in latter species.

Allotype.—Female; same data as type. [Academy of Natural Sciences of Philadelphia.]

Differing from the male description in the following noteworthy features.

Slightly larger in general size.

Interspace between eyes (occipital) subequal to occipital depth of eye.

Supra-anal plate of female trigonal, supra-cercal emarginations evident and arcuate, distal extremity with a small and narrow, but relatively deep, U-shaped emargination. Subgenital plate of the type usual in the sex in this genus, weakly compressed in distal third, distal section or apex of ventral surface distinctly though rather briefly sulcate, apical margin hardly emarginate when seen in direct ventral aspect.

General color as in *N. eurydice.* Interocular region with a transverse bar of russet (♀) to mummy brown, becoming obsolete and evanescent toward the occiput, much more sharply defined ventrad; ocellar spots surrounded by russet (♀) to mars brown (♂), which color forms a distinct but not sharply defined bar across the upper face between the ocellar spots and separated from the interocular bar by a transverse area of the pale base color; eyes russet to mummy brown. Pronotal disk with the usual closely placed caudal pair of dark dots and more distant median pair, and an associated pair of cephalic dashes and caudal dots, the more nebulous dots and clouds are indicated cephalad on the disk and caudo-laterad of the median dots. Tegmina and wings colored as usual in group. Venter of abdomen of male colored much as in *N. eurydice,* but with lateral dark bars intermarginal and more prominent than median bar, which latter reaches caudad only to antepenultimate sternite, apical cinnamon-rufous wash marked; in female colored much as in *N. eurydice* but lateral dark bars broader, and the suffused section of the subgenital plate has much of its median portion distinctly ferruginous. Cerci colored as in *eurydice.* Femora and tibiæ with area about spine bases and adjacent margins washed with mummy brown.

Type.—Length of body, 12.8 mm.; length of pronotum, 3.2; greatest width of pronotum, 4.4; length of tegmen, 14.5; greatest width of tegmen, 4.

Allotype.—Length of body, 13.3 mm.; length of pronotum, 3.7; greatest width of pronotum, 5; length of tegmen, 16; greatest width of tegmen, 4.4.

The type and allotype are the only individuals of this species we have seen. It is unfortunate we have no material from Jamaica with exact information, but the species is so distinctive in the genitalic features of the male, its description, as is also the case with *N. tridens*, must be presented to complete the known forms of West Indian Blattidæ.

Neoblattella tridens, new species

Plate IV, Figures 10 to 11

A species which in general appearance is very similiar to *N. celeripes*, but having the distal margin of the male subgenital plate tridentate, by marked diverging peg-like productions of the caudo-lateral angles as well as a pronounced median production. This margin suggests somewhat the structure found in *proserpina*, but the productions are all peg-like and narrow, and not trigonal as in the latter species, while many features of the general form are different.

Type.—Male; taken from S. S. 'St. Mary,' at Philadelphia, with fruit from Bowden, Jamaica.[1] May 8, 1922. (M. Kisliuk.) [Academy of Natural Sciences of Philadelphia, Type No. 5413.]

Size, general form, and surface as in *N. celeripes*.

Head much as in *N. celeripes*; occipital interspace slightly greater than in *celeripes*, in type four-fifths as great as occipital depth of eye. Palpi intermediate between those of *eurydice* and *celeripes* in length.

Pronotum essentially as in *N. eurydice* and *N. celeripes*. Tegmina and wings surpassing apex of abdomen by slightly more than the pronotal length; tegminal character as in *N. eurydice* and *celeripes*.

Supra-anal plate transverse trigonal, apex very shallowly concave. Subgenital plate basically as in *N. celeripes* but median digitiform production more delicate and less pronounced, while caudo-laterad the distal margin of plate develops diverging peg-like processes, which are about as long as but broader than median production, these lateral productions may (type) or may not vary in relative width, their distal margin and dorsal surface with spaced spiniform teeth: styles as in *N. celeripes*.

Limbs as in *N. celeripes*.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, type	13.5	3.5	4.8	15.8	4 mm.
♂, from S. S. 'Runa,' paratype	11.2	3.3	4.5	14.6	4
♂, from S. S. 'Runa,' paratype	12.7	3.4	4.6	15.5	4

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[1] Our comments on the actual origin of this material would be somewhat different from those made under *N. celeripes* (see footnote 2, page 71), some of the material of *tridens* examined by us probably having been from the north coast of Jamaica, as the ship bearing it cleared from Port Antonio. In consequence we cannot hazard a suggestion as to the probable habitat area of the species, except that it is a native of the lower country of Jamaica where bananas are cultivated.

Coloration as in *N. celeripes* with the following exceptions. Interocular occipital dark bar slightly more extensive ventrad; interocellar dark bar broken mesad, where the ends of the lateral halves are somewhat broadened. Apex of venter of abdomen less distinctly rufescent; ventral median dark line usually more extensive, generally reaching to ultimate sternite, but occasionally not reaching distad of the antepenultimate one; lateral dark ventral bars somewhat broader.

In addition to the type we have before us six male paratypes, all taken from fruit steamers at Philadephia. One bears the same data as the type, while the remaining five were taken in 1922 by M. Kisliuk, from the S. S. 'Runa,' in from Port Antonio, Jamaica. These specimens show no noteworthy differences not mentioned above, while the size varies slightly as the above table of measurements shows.

Neoblattella detersa (Walker)[1]

Plates IV, Figure 7; VI, Figures 7 to 10

Blatta detersa Walker, 1868, 'Catal. Blatt. Brit. Mus.,' p. 215. ♀; Jamaica.

Jamaica.—Montego Bay, St. James Parish, III, 4, 1911, (J. Grossbeck; under dried cocoanut palm leaves), 1♂; X, 28, XI, 2, 1913, (M. Hebard; in dried leaves under acacias on hillside and in débris near beach), 1♂, 2♀, [Hebard Cln.]. Palm Beach, Montego Bay, III, 3, 1911, (J. Grossbeck; under stones on coral rock), 1♀. Dunrobin District, Mandeville, Manchester Parish, 2350 feet, XI, 29, 1919, (F. E. Watson; taken by sweeping), 1♀. Near Bog Walk, Rio Cobre, St. Catherine Parish, X, 25, 1913, (M. Hebard; in leaf mould under dense brush on hillside), 1 immat. ♂,]Hebard Cln.]. Stony Hill, St. Andrew Parish, X, 25, 1913, (M. Hebard; in dead leaves under dense brush on hillside), 2♂, 3♀, 1 immat. ♂, 2 immat. ♀, [Hebard Cln.]. Ferry River, near Kingston, VII, 5, 1920, (R. and H.; in short grass under dead cocoanut petioles in open spots), 1♂, 1 immat. ♀, [A. N. S. P.]. Kingston, St. Andrew Parish, X, 24, 1913, (M. Hebard; in débris near beach), 1♂, 1♀, [Hebard Cln.]. Constant Spring, St. Andrew Parish, 650 feet, I, 4–24, 1920, (H. E. Machado), 1♂. Pleasant Hill, Blue Mountains, 3800 feet, VII, 24, 1923, (Rehn; from under bracts of banana blossoms), 1♂, [A. N. S. P.]. Jamaica [no exact locality], (C. W. Johnson), 1 ♂, [A. N. S. P.].

Hispaniola.—Haiti [no exact locality], 1♂, 1♀, [Museum of Comparative Zoölogy].

While there is a certain amount of uncertainty in genera as difficult as *Neoblattella*, in the recognition of species based upon the female sex, we feel convinced of the correctness of our association of Walker's *detersa*.

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[1] In part *azteca* of Rehn (not of Saussure and Zehntner, 1893), 1903, Trans. Amer. Entom. Soc., XXIX, p. 268.

Uvarov has compared a female of the species here reported with the type of *detersa*, and he states they are the same. In the original, and otherwise very vague, description certain colorational features are mentioned, combined with size, which also point to this species of those known from the type locality.

The ulnar vein of the wing has from three to five rami, while the paired dark ventro-lateral abdominal bars, mentioned in the description, are variable in depth, in the Kingston female being much reduced in width and depth of tone, in the Palm Beach female subobsolete. The punctulation of the pronotal disk is variable in degree, one extreme having not more than three pairs of blackish points on a pale ochraceous ground, the other having a relatively complex pattern of blackish points and curved dashes on a ground varying from pale ochraceous to pale tawny. In size there is considerable variation, the extremes of the series measuring (in millimeters) as follows.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen
♂, Haiti	9.5	3	4.1	12 mm.
♂, Stony Hill, Jamaica	11	3.2	4.4	14
♀, Montego Bay, Jamaica	10.7	3	4	10.3
♀, Palm Beach, Jamaica	11.6	3.5	4.5	13.3

Both of the Haitian individuals are smaller than the average of the Jamaican specimens.

The palpi are here figured, as well as the genitalic features of both sexes. The interocular space in the male specimens shows a very decided amount of variation, ranging from less than one-third of to subequal to the occipital depth of eye. This variation is not correlated with fluctuations in the male genitalic features and the extremes are found in the Jamaican series.

The male genitalic features may be briefly characterized as follows.

Supra-anal plate strongly transverse, broadly trigonal, the lateral portions of the margin straight oblique from the cercal flexures, apex rather broadly and rather shallowly arcuate-emarginate: cerci elongate, tapering, attenuate distad and with apex moderately acute, segments moniliform, depressed dorsad, segments individually rounded ventrad: subgenital plate moderately transverse, lateral portions reflexed and vertical; distal margin from bases of styles obtuse-angulate, with a decided, rostrate process, which is arcuate dorsad and decurved and weakly bulbous at the apex, the dorsal surface of the apex of the process clothed with moderately adpressed, hooked teeth, the process varying greatly in width and somewhat in length, ranging from broad, linguiform, subdepressed, with broadly arcuate (transversely) distal margin (Plate IV, fig. 7), to an extreme which is pinched proximo-ventrad, stiffened by lateral, diverging wings, which form erect vertical lamella on the dorsal surface of the plate, briefly within the distal margin as seen from the venter (Plate V, figs. 7 and 8); styles not reaching to the apex of the median process, rod-like, arcuate, with their tips diverging.

The important female genitalic features are as follows.

Supra-anal plate transverse trigonal, slightly more longitudinal than in male; distal margin with lateral portions very weakly arcuate-emarginate; apex with a distinct, but not extensive, semi-elliptical emargination: subgenital plate large, weakly rostrate distad, the distal margin with its lateral portions slightly acute convergent and straight, apex narrowly truncate to subemarginate, ventral surface of apex appreciably but not decidedly medio-longitudinally sulcate.

The extremes of development of the median process of the distal margin of the male subgenital plate are found in material from the same section of Jamaica, from points as little distant as Stony Hill and Constant Spring, which are separated by but little over two miles of distance and a few hundred feet of elevation. The specimen from Pleasant Hill, at 3800 feet elevation, the highest locality we have for the species, is identical in the form of the process with the specimen from the Ferry River, which is from virtually sea-level. From this it is evident there is no local or altitudinal correlation of the development of this process. The Haitian male has the process broad and short. The immature male from Stony Hill shows the beginning of the median production of the subgenital plate.

The records of this species from Southern Florida by the present authors[1] have been shown by Hebard[2] to refer to *Latiblattella rehni* Hebard. The present species is known only from Jamaica and Hispaniola. Apparently the species does not reach into the region of the true mountain forest, as no indication of it was seen in that area, and at Pleasant Hill, at 3800 feet, it occurred in cultivated land.

Neoblattella semota,[3] new species

Plate IV, Figures 12 to 16

A near relative of *N. detersa*, which is a native of the same island (Jamaica), but readily distinguishable by the more elongate form, distinctly barred interocular and interocellar regions, the non-emarginate male supra-anal plate and the greatly elongate sub-falciform median production of the male subgenital plate. The latter character alone will at once distinguish males of the two species. No close affinity exists with any of the other species of the genus here treated.

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[1] 1914, Proc. Acad. Nat. Sci. Phila., p. 379, and 1914, Journ. N.Y. Ent. Soc., XXII, p. 98.

[2] 1917, Mem. Amer. Ent. Soc., No. 2, p. 38.

[3] I. e., different, distinct.

TYPE.—Male; Pleasant Hill, Blue Mountains, Jamaica. Elevation, 3800 feet. July 28, 1923. (Rehn; among dead bracts of banana blossoms.) [Academy of Natural Sciences of Philadelphia, Type No. 5414.]

Size less than medium (for genus); form and surface as usual in group.

Head visible cephalad of pronotum when seen from dorsum for nearly entire width of head: in cephalic aspect the head outline is pyriform, greatest width across eyes about four-fifths of greatest depth of head: occipital interspace between eyes equal to about three-fourths occipital depth of eye; that between ocellar spots nearly twice as wide as that between eyes. Palpi more elongate and more slender than in *detersa*, ultimate joint proportionately shorter in relation to penultimate joint than in *detersa*.

Pronotum as in *N. detersa*. Tegmina and wings elongate, surpassing apex of abdomen by a distance equal to twice length of pronotum: marginal field narrower and more elongate than in *detersa;* discoidal field with eight sectors.

Supra-anal plate of male transverse trigonal, apex of margin arcuate, non-emarginate. Subgenital plate of the transverse rectangulate type usual in the group; distal margin with median production greatly developed, forming an elongate, falciform appendage slightly longer than median length of other portion of plate and greater than half of proximal width of same, seen from venter the production regularly narrows to its middle, thence appreciably compressed and subequal with apex narrowly rounded, in profile the production is directed dorso-caudad, very faintly deepening from middle distad, apex with scattered depressed spiniform denticulations; stylar grooves virtually forming part of the distal margin, broad but very shallow, disto-mesad passing into proximal portion of median production: styles much as in *N. detersa*, robust, short, converging, roughly tapering, somewhat arcuate. Cerci more slender distad, seen from venter, than in *N. detersa*, the six distal segments longer than broad.

Caudal metatarsus slightly larger in proportion than in *N. detersa*, more slender. Tarsal claws as in *N. detersa*.

ALLOTYPE.—Female; same data as type. [Academy of Natural Sciences of Philadelphia.]

Differing from the above description of the male (type) in the following noteworthy features.

Interspace between eyes broader, one-fifth greater than occipital depth of eye; that between ocellar spots little more than one and two-third times interspace between eyes.

Tegmina and wings surpassing apex of abdomen by a distance equal to not more than one and one-half times pronotal length.

Supra-anal plate of female trigonal, apex narrowly U-emarginate. Subgenital plate of female of the type usual in this group of genus, appreciably rostrate, acuminate compressed distad, apical margin narrowly subtruncate, ventral surface of distal rostration shallowly but appreciably medio-longitudinally sulcate; cingulation of lateral margins becoming obsolete between infra-cercal emarginations and apex of plate.

General color tone pale cinnamon-buff to clay color, the lateral portions of the pronotum, marginal and much of the discoidal fields of the tegmina virtually clear hyaline. Interocular dark bar and a generally broken interocellar dark bar cinnamon-brown to prout's brown, the interocellar bar in form much like that found in *N. tridens*, when broken the sections are broader at the break than laterad near the ocelli.

Antennæ occasionally washed with cinnamon-brown. Eyes russet to bay and mummy brown. Disk of pronotum with its dark (cinnamon-brown to mummy brown) pattern of dots varying from a minimum of a caudad disposed and closely placed pair and a median more distant and irregularly blotch-like pair, to a more complicated pattern (well exemplified by the type) which has a cephalic pair of dots, about five additional pairs of dots mesad and several curved lines; occasionally the pronotal disk is to some extent outlined by a fine dark line. Venter of abdomen with a dark median and paired intermarginal dark prout's brown to mummy brown lateral bars, which rarely are subobsolete, the median bar broad proximad and narrow distad, generally reaching penultimate sternite, lateral bars relatively narrow but varying somewhat in width and solidity, reaching the base of the subgenital plate in the female and absent from this plate and the preceding sternite in the male. Limbs colored as usual in the group.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Pleasant Hill, Jamaica, type.........	11.5	2.8	3.8	14.7	3.7 mm.
♂, Pleasant Hill, Jamaica, paratype....	10.6	2.8	3.8	14.2	3.8
♀, Pleasant Hill, Jamaica, allotype.....	13	3.1	4.2	14.8	3.8
♀, Pleasant Hill, Jamaica, paratype...	11.9	3.2	4	14.6	3.8

In addition to the type and allotype we have before us a paratypic series of seven males and five females, all taken by the senior author at Pleasant Hill, at the same elevation and under the same conditions as the type and allotype, on dates ranging from July 21 to 28, 1923.

As the above measurements of extremes show, there is but little variation in size in either sex. The only structural feature which exhibits noteworthy variation is that the occipital interspace between the eyes in the male sex varies to a width equal to the occipital depth of the eye.

The immature males are all in the instar preceding maturity and show a well-developed predecessor of the relatively elongate median production of the adult subgenital plate. In all of them the interocular and facial pattern is distinctively characteristic and essentially as in the adult. The venter of the abdomen has the greater portion of its disk solidly infuscate and the paired longitudinal intermarginal lines are narrow and relatively weak.

This species is exceedingly active when disturbed from its favorite hiding place under the dead bracts of banana blossoms. The series was taken by placing a heavy beating net around the blossom tip and then carefully stripping off the bracts. The cockroaches falling into the net would run about most actively, taking flight occasionally. The species was never noted at light, which would seem to indicate it is not an active night form, as Pleasant Hill House is but a few hundred yards from the small banana patches which yielded the series, and in addition to the regular lights of the house, which attracted some most interesting forms, a powerful gasolene pressure light was used a number of nights.

The female taken July 21 is teneral, which, taken with the occurrence of immature males as late as July 24, may indicate that the species was then just reaching maturity.

Neoblattella adusta (Caudell)

Ischnoptera adusta CAUDELL, 1905, Canad. Entom., XXXVII, p. 237. ♂; Arroyo, Porto Rico.

The present species has proved one of the most puzzling of the West Indian Pseudomopinæ. It was evident that it was not an *Ischnoptera*, and the unique male type, now in the United States Natural Museum, was re-examined by Mr. Caudell, and finally by both of the authors before we felt sure of its association. It is clearly a very sharply defined and rather aberrant member of the *Detersa* Group, nearest to *borinquenensis* and *vomer* here described, and not at all close to *carcinus*, *vatia*, *eurydice*, *proserpina*, *celeripes*, *tridens*, *detersa* and *semota*.

From *borinquenensis* and *vomer*, *adusta* can be separated by the very different male genitalia, different proportions of the maxillary palpal joints and the different pronotal proportions. The diagnostic features of the species may thus be summarized.

Head flattened; interocular space broad, slightly narrower than distance between antennal sockets. Palpi with third and fourth joints very elongate and slender. Pronotum very weakly transverse, subtrapeziform. Ventro-cephalic margin of cephalic femora with "Type A" spination; apical spines on same margin two in number. Three proximal tarsal joints with very small distal pulvilli; small fourth joint with ventral surface completely occupied by a pulvillus. Well-developed arolia present. Tegmina elongate, with eight longitudinal discoidal sectors; anal field quite long. Wings with costal veins very slightly enlarged distad; ulnar vein quadriramose, two of these bifurcate.

Dorsal surface of abdomen of male not specialized. Supra-anal plate of male simple, transverse, distal margin very broadly obtuse-angulate; cerci strongly tapering distad. Subgenital plate of male very complex, transverse trapeziform when seen from venter, lateral portions bent dorsad, the whole rather scoop-shaped; distal margin unarmed, not thickened, obtuse-angulate mesad when seen from venter, U-emarginate when seen in caudal aspect; lateral margins of plate proximad unarmed, raised, distad these margins are raised, thickly supplied with stout chitinous spinulæ: styles inserted in deep incisions in the lateral margins, rod-like, surpassing the distal margin of the plate, armed on their disto-internal face with fine denticulations. Genital hook simple.

This species may be the one referred to by Gundlach as *Blatta vitrea*,[1] from Porto Rico without exact locality, or by the same author as the manuscript *Blatta caraibea*,[2] from houses in Mayaguez. The two following species, i. e., *borinquenensis* and *vomer*, may with equal propriety be the ones referred to in these unassignable records of Gundlach.

The type of this species was taken at light, February, 1899, at Arroyo, Department of Guayama, Porto Rico. The species has not been recorded since the original description.

Neoblattella borinquenensis,[3] new species

Plate V, Figures 11 to 13

A member of the *Detersa* Group of the genus and a relative of *adusta* (Caudell), from Porto Rico, but readily separable from this, as well as the other members of the group, by the distinctive male genital features, particularly the form of the subgenital plate. In the female sex we find the head slightly less depressed, the eyes deeper, the interspace between the same much greater and the pronotum more rounded than in *detersa*, while the subgenital plate is non-sulcate distad on ventral surface as in *vatia*.

TYPE.—Male; El Yunque, Department of Humacao, Porto Rico. Elevation, 800 feet. (C. W. Richmond.) [United States National Museum.]

Size medium (for the genus); form and surface as usual in the group.

Head narrowly visible cephalad of the pronotum: occipital line nearly straight; least interspace between eyes subequal to the occipital depth of eye, the occiput broadening dorso-caudad; interocellar width slightly greater than the least interocular width; ocelli of medium size, slightly prominent, subovate in outline, with their axes oblique: face not appreciably deplanate; lateral margins of face briefly ventrad of eyes straight, moderately converging ventro-caudad. Palpi very elongate, extremely slender; third joint nearly straight, cylindrical; fourth joint subequal in length to third, weakly but regularly infundibuliform; fifth joint about three-fifths the length of fourth joint, lanceolate, weakly inflated, apex blunted acuminate. Eyes slightly prominent, reniform in outline, broad toward the occiput, narrowing caudo-ventrad. Antennæ surpassing the body in length; proximal joint large.

Pronotum transverse, trapeziform subovate, greatest length contained one and two-fifths times in greatest width, the latter slightly caudad of the middle; cephalic margin of medium width, truncato-arcuate, appreciably rounding into the truncato-arcuate cephalic section of the lateral margins, which broadly round at the lateral angles into the short, converging truncato-arcuate section; latero-caudal angles faintly obtuse, hardly marked; caudal margin very broadly and weakly obtuse-angulate. Lateral portions of pronotum semi-hyaline: in transverse section the pronotum is but faintly, and then very broadly, depressed laterad.

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[1] 1887, Anal. Soc. Españ. Hist. Nat., XVI, p. 141.

[2] Idem, p. 141.

[3] This is the species reported by Rehn on the basis of the female sex alone, from Utuado, Department of Arecibo, Porto Rico, as *Phyllodromia punctulata* (1903, Trans. Amer. Entom. Soc., XXIX, p. 130), which name was then not interpreted as it is today; later, by the same author, as *Blattella azteca* (in part) (1903, idem, p. 258), from El Yunque, Department of Humacao, Porto Rico. The material on which these records were based is now before us, the type of *borinquenensis* being the El Yunque male previously recorded. As we have already remarked under *N. adusta*, this species may be one of those referred to by Gundlach as *vitrea* and *caraibea*.

Tegmina elongate, lanceolate, very considerably surpassing the apex of the abdomen; costal and sutural margins as usual in this group; apex rounded rectangulate. Marginal field of tegmina of medium width, relatively elongate; scapular field broad; anal field elongate pyriform. Costal veins of tegmina sublongitudinal, a few distad bifurcate; discoidal sectors nine to ten in number; axillary veins of tegmina six in number. Wings reaching to the apices of the tegmina when closed; apex subrectangulate; costal margin arcuato-truncate in the region of the costal veins; intercalated triangle small but distinct, narrow. Costal veins of wing numerous, of which the proximal nine are moderately elongate and acute clavate, the distal ones greatly ramifying; medio-discoidal area slightly broader than medio-ulnar area, with few, regular and well-spaced cross-veinlets, forming rectangulate areolets; ulnar vein with four rami, one or more occasionally biramose; axillary vein triramose on the side toward the anal vein, one or more rami occasionally bifurcate or even ramose.

Abdomen with dorsal surface apparently unspecialized.[1] Supra-anal plate transverse, distal margin weakly arcuate produced, faintly arcuate-emarginate laterad, mesad with a very shallow, obtuse-angulate emargination.[2] Cerci incomplete in the type. Subgenital plate moderately produced, scoop-shaped, the lateral portions of the plate reflexed, when seen from the venter the lateral margins of the plate are arcuate, and weakly convergent to the bases of the styles; distal portion of plate between bases of styles moderately transverse, its lateral margins subparallel, the disto-lateral angles rounded, the distal margin broadly arcuate-emarginate: styles moderately surpassing the distal margin of plate, spiniform, tapering, weakly falcate.

Median and caudal femora with decided genicular spines. Cephalic femora relatively slender: ventro-cephalic margin of same with the larger spines proximad about three times as long as those at distal third, apical spines two in number, elongate, the distal the longer; ventro-caudal margin with five spaced, elongate spines. Median and caudal femora with caudal margins having large, well-spaced spines. Metatarsi biseriate spinose ventrad[3]; metatarsus and second joint with apical pulvilli, the third and fourth joints with pulvilli occupying virtually all of ventral surface, arolia present; tarsal claws with lamella serrulate.

ALLOTYPE.—Female[4]; Manati, Department of San Juan, Porto Rico. June 27–29, 1915. (Lutz and Mutchler; at automobile headlight, on road to Ciales.) [New York Academy of Sciences; American Museum of Natural History.]

Differing from the description of the male in the following features.

Interspace between eyes slightly greater than occipital depth of eye; ocelli less prominent than in male.

Tegmina with greatest width contained approximately three and one-fifth times in greatest length.

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[1] There is a certain amount of shrinkage and distortion of the dorsal surface of the abdomen evident in the unique male available, and the exact character of the surface is hard to determine.

[2] The form of the supra-anal plate is virtually reconstructed, as this portion is greatly and abnormally compressed in the type.

[3] Caudal tarsi missing.

[4] The association of this female with the male type is warranted as far as the material before us goes. The female of *adusta* is, however, unknown, and its relationship to the females of the other species cannot at present be determined. In consequence there is some possibility of error in the assignment of females to *borinquenensis* and *vomer*, but only the acquisition of mated material, or the discovery of satisfactory differential ambisexual characters, will definitely settle the matter.

Supra-anal plate transverse subtrigonal, the lateral portions of the distal margins faintly arcuato-emarginate, apex V-fissate. Cerci damaged. Subgenital plate large, scoop-shaped, moderately rostrate distad, the lateral margins converging from the cercal emarginations to the narrowly subtruncate apex; ventral surface of subgenital plate non-sulcate.

Caudal metatarsus forming three-fifths of entire tarsal length, the ventral margins with the spines well spaced and fewer than usual.

General dorsal coloration between antimony yellow and buckthorn brown, subhyaline on the tegmina and the lateral portions of pronotum, opaque and nearly antimony yellow on pronotal disk, passing to light buff on dorsum of abdomen. Ventral and limb coloration antimony yellow. Head with occiput and region between the ocelli and antennal bases cinnamon-rufous to cinnamon-brown, leaving a pale intermediate bar, the dark areas occasionally subobsolete; face not otherwise marked with dark: eyes blackish brown to russet, mottled with fuscous: palpi with third and fourth joints finely lined with fuscous on flexor surface: antennæ washed with ferruginous, weakening proximad; proximal joint with fine line of brownish. Pronotum with discal dark spots grouped as follows: three pairs mesad; one pair, more approximate, caudad; one widely-spaced pair mesad, on the discal margins; one well-spaced pair cephalo-mesad. Wings with venation pencilled in buckthorn brown. Dorsum of abdomen with segmental margining caudad, lateral oblique clouds and gland spots mummy brown; transverse fine lines on supra-anal plate, ultimate and penultimate segment of same color. Venter of abdomen, with gland spots mummy brown, laterad of these are occasionally present clouds of cinnamon-brown; subgenital plate with a ferruginous touch mesad; cerci ventrad with segments individually suffused with pale mummy brown; median and caudal femora with areas at insertion of spines mummy brown.

Male (type).—Length of body, 9.2 mm.[1]; length of pronotum, 3.2; greatest width of pronotum, 4.6; length of tegmen, 13.8; greatest width of tegmen.[2]

Female (allotype).—Length of body, 12 mm.; length of pronotum, 3.2; greatest width of pronotum, 4.6; length of tegmen, 13.4; greatest width of tegmen, 4.2.

In addition to the type and allotype we have before us another female bearing the same data as the allotype, from The American Museum of Natural History, the female from Utuado, Department of Arecibo, Porto Rico, January, 1899, (A. Busck), previously recorded by Rehn as *Phyllodromia punctulata*,[3] from the United States National Museum, and a third female from Rio Piedras, Department of San Juan, Porto Rico, taken April 7, 1922 by F. Seín, and in the Academy of Natural Sciences of Philadelphia. The Manati female we consider a paratype. In addition we have before us an immature female from Caguas, Department of Guayama, Porto Rico, May 28–29, 1915 (Lutz and Mutchler; bushy vegetation on river bank), from The American Museum of Natural History, which we refer here, at least provisionally.

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[1] Body shrunken.

[2] Tegmina curled so that measurement cannot be taken.

[3] See page 80, footnote 3.

In the adults we find the number of tegminal discoidal sectors varies from as many as ten to as few as seven. The Utuado female also has the fissure of the supra-anal plate somewhat shallower and more U-shaped than in the others.

The immature specimen has the face and occiput infuscate, a broad interocular bar immediately ventro-caudad of least width of the interspace, and a transverse subarcuate line on the lower face, pale; the three proximal antennal joints, the palpi, the extensor margin of the femora, the apices of the same, the extensor surface of the tibiæ, and base and apex of same and the tarsal joints distad, infuscate; cerci blackish at base, then two joints pale, then infuscate distad; dorsal surface of abdomen dark, speckled with small pale dots: mesonotum with a pair of large pale spots; pronotum with pattern of adults.

Neoblattella vomer,[1] new species

Plate V, Figures 14 to 18

A member of the *Detersa* Group and apparently near *borinquenensis* in a linear arrangement. The structure of the subgenital plate of the male is very distinctive and will prove of great value in identifying that sex. The female has a non-sulcate subgenital plate, in this agreeing with *N. vatia* and *borinquenensis*.

TYPE.—Male; Mayaguez, Department of Mayaguez, Porto Rico. July 24–29, 1914. (H. G. Barber; beaten from vegetation.) [New York Academy of Sciences; American Museum of Natural History.]

Size median large; form and surface as usual in the group.

Head very narrowly projecting cephalad of the pronotum; occipital outline very weakly arcuate; interspace between eyes slightly greater than occipital depth of eye; interocellar space appreciably wider than that between eyes; ocelli distinct, relatively small, subcircular in outline; face subdeplanate; lateral margins of face very weakly converging ventrad. Palpi very elongate and slender; third joint subequal in width, very faintly arcuate proximad; fourth subequal to third joint, weakly but distinctly infundibuliform; fifth joint about three-quarters as long as fourth joint, moderately inflated, lanceolate in dorsal view, acuminate in profile. Eyes weakly projecting laterad; in base outline reniform, strongly narrowing caudoventrad, deep at the occiput. Antennæ with proximal joint large, moderately inflated.

Pronotum of the type usual in this group, greatest length contained about onethird in greatest width; cephalic margin subtruncate; latero-cephalic angles broadly rounded; lateral margins broadly arcuate divergent, point of greatest width distinctly caudad of middle, rounded; latero-caudal angles rounded obtuse; caudal margin very weakly obtuse-angulate.

Tegmina surpassing the apex of the abdomen by more than pronotal length, lanceolate, greatest width contained nearly three and one-half times in greatest length; costal margin arcuate proximad, nearly straight for most of the length of the scapular field, narrowly arcuate to the rounded but subacute apex, which is slightly nearer the costal than the sutural margin. Marginal field of tegmina of medium width, elongate; scapular field mesad occupying faintly more than one-half of tegminal width; anal field elongate pyriform. Costal veins of tegmina strongly oblique, those distad moderately ramose; discoidal sectors eight in number; axillary veins six in number. Wings damaged in type.

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[1] As we have stated in footnote under *adusta*, this species may be one of those reported from Porto Rico by Gundlach as *Blatta vitrea* and *Blatta caraibea*.

Abdominal tergites unspecialized. Supra-anal plate strongly transverse, greatest length contained nearly four times in greatest width; margin arcuate with a very minute median fissation. Cerci damaged in type. Subgenital plate symmetrical, moderately transverse, trigonal; lateral portions laterad of base of styles weakly reflexed dorsad and with their margins straight oblique (i. e., when seen from venter); portion between base of styles acute-angulate produced, when seen in profile moderately decurved and subrostrate, thickened and elevated on dorsal surface and there proximad with converging V-shaped ridges: styles reaching nearly to apex of plate, simple, tapering, aciculate, falcate, the curvature dorsad, their bases inserted in acute-angulate incisures in the margin of the plate.

Cephalic femora moderately slender; ventro-cephalic margin of same with the regular series of spines of "Type A" decreasing in length distad; apical spines of ventro-cephalic margin two in number, the distal the longer; ventro-caudal margin of cephalic femora with series of five spines on distal two-thirds. Median and caudal femora with ventral margins with regular series of well-developed spines. Caudal metatarsi, elongate, armed ventrad with biseriately disposed spines, fewer than usual and most numerous distad; pulvillus small and apical. Other caudal joints missing (see allotype description); cephalic and median tarsi with apical pulvilli on all but distal joints.

ALLOTYPE.—Female; Adjuntas, Department of Aquadilla, Porto Rico. July 8–13, 1915. (Lutz and Mutchler; beaten in mixed forest on Janya road.) [New York Academy of Sciences; American Museum of Natural History.]

Differing from the description of the male type in the following features.

Size smaller than in male.[1]

Interspace between eyes about one and a quarter times the occipital depth of eye.

Wings damaged but certain features ascertainable. Costal veins with six proximal ones elongate clavate; ulnar vein with five complete rami.

Supra-anal plate transverse trigonal, apex V-emarginate, the angles laterad of same narrowly rounded. Cerci elongate, fusiform, attenuate distad, composed of twelve segments, distal two-thirds with segments moniliform, subdeplanate dorsad, segments individually rounded ventrad. Subgenital plate large, subrostrate; subdeplanate laterad, median portion arcuate transversely; cercal emargination evident, rounded obtuse; distal margin acute-angulate with the immediate angle narrowly arcuato-truncate; ventral surface non-sulcate distad.

Caudal tarsi with metatarsus, and second and third joints having small apical pulvilli, ventral surface of these joints biseriately spinose; fourth joint of caudal tarsi with pulvillus elongate, acute distad, and occupying almost the entire ventral surface of article.

General dorsal coloration between antimony yellow and buckthorn brown, very weak and subhyaline on the peripheral portions of the pronotum, and the marginal

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[1] This is, in all probability, a purely individual character.

field and costal section of the marginal field of the tegmina. General ventral coloration yellow ocher. Pronotum with the disk bearing the following fine maculations of blackish brown: a median, closely-placed paired group of three comma-like dashes; a caudal, more closely-placed, pair of simple points; mesad, a widely separated pair of simple dots, which are placed at the lateral margins of the disk; cephalad, a moderately spaced pair of comma-like dashes. Wings with the veins pencilled in buckthorn brown. Head with occiput, interocular and interocellar regions prout's brown, with a narrow edging of the paler base color next the eye margins, and with the maculation very broad obtuse-angulate ventrad: face with two transverse lines of prout's brown, one between the antennal bases, broadly U-shaped and broken mesad, the other reversed broadly W-shaped, and on lower portion of face; lateral margins of face marked with prout's brown: eyes blackish brown and tawny, mottled; palpi weakly lined ventrad with fuscous; antennæ with proximal joint lined laterad with prout's brown. Abdomen with segmental margins and adjacent surface suffused to a variable extent with mummy brown, in the male the margins of the ultimate and penultimate tergites and of the supra-anal plate sharply but narrowly pencilled with mummy brown. Ventral surface of abdomen appreciably suffused laterad with mummy brown, the gland spots solidly pointed with the same. Cerci in general pale dorsad, ventrad with segments individually and weakly washed with mummy brown. Femora weakly (median and caudal) or distinctly (cephalic) lined with tawny to mummy brown on dorsal margin; tibiæ and tarsal joints tipped with tawny to mummy brown, insertion of spines on ventro-caudal margin of cephalic femora, both margins of median and caudal femora and on extensor surface of tibiæ marked with mummy brown, with tawny in female.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, type.................	11.9	3.4	4.5	14.5	4.2 mm.
♀, allotype............	10.6	3.1	3.9	12.6	3.6

The type and allotype are the only adult specimens of this species seen by us. A male individual in the instar preceding maturity, taken at Rio Piedras, Department of San Juan, Porto Rico, March 23, 1920, by G. N. Wolcott, and in the U. S. National Museum, is referred to this species.

THE *Lucubrans* GROUP OF THE GENUS *Neoblattella*

The four species here assembled constitute a group, that as far as known is entirely West Indian, and which we have provisionally called the *Lucubrans* Group. Whether this assemblage will prove to be a natural species group largely depends on the characters of the male sex of two of the species, which are not known at present. The species here associated, however, show certain features in the female sex alone which apparently remove them from the vicinity of the other species of the genus seen by us. Until we know more about *Neoblattella* as a whole, and have a better conception of the interrelations of its forms, the *Lucubrans* Group may be utilized as a convenient designation for these Antillean species.

They are characterized chiefly by the tarsal claws lacking a pronounced preapical emargination or shoulder on the ventral margin, and in the male sex (where this is known) having the styles of the subgenital plate very short, lamellate and transverse, while there is no pronounced median production of the subgenital plate in the same sex. The texture is relatively smooth, the palpi short, the interocular space relatively broad, the pronotum always appreciably transverse.

Certain of these features may be found to have little group importance in combination with the others, as is known to be the case with most of them individually, but this can be determined only after more comprehensive study of the genus as a whole.

KEY TO THE SPECIES OF THE *Lucubrans* GROUP OF THE GENUS *Neoblattella*

1. Anal field of tegmina as usual in genus, moderately pyriform; axillary veins of same field with usual amount of curvature .... 2.

Anal field of tegmina more acute and elongate (*lucubrans*) or markedly elongate (*dryas*); axillary veins of same field largely straight, those mesad parallel .... 3.

2. Tegmina of female but slightly surpassing apex of abdomen; marginal field of same very broad. Pronotum strongly transverse elliptical. Ventro-cephalic margin of cephalic femora with proximal spines large, strongly differentiated from those more distad in position. Face with a single pale interocellar arcuate bar. Male unknown. (Hispaniola.) *infausta*, new species.

Tegmina of female decidedly surpassing apex of abdomen; marginal field of same distinctly narrower. Pronotum transverse trapezoidal. Ventro-cephalic margin of cephalic femora with proximal spines relatively small, not strongly contrasted or differentiated from those more distad in position. Face with a pale interocellar arcuate bar, dorsad bordered by a broad dark interocular bar, and ventrad by a fusiform transverse dark bar; remainder of face bearing a dark inter-antennal bar and a dark infra-antennal bar. Male unknown. (Jamaica.) .... *grossbecki*, new species.

3. Pronotum in general form transversely subtrapezoidal, caudal margin moderately arcuate. Tegmina markedly surpassing apex of abdomen in male sex; venation more evident, texture less corneous; marginal field of tegmina relatively narrower and more elongate; anal field less attenuate distad; discoidal field of tegmina relatively broad, of normal type, sectors more numerous (seven). Interocular space subequal to occipital depth of eye. Head markings consisting only of dark interocular bar. Cerci of male of the type usual in genus. Supra-anal plate of male trans-

verse, with a pronounced medio-distal V-emargination. Female unknown. (Jamaica.) . . . . *lucubrans*, new species.

Pronotum in general form virtually semicircular, somewhat flattened cephalad, caudal margin very broad, distinctly subtruncate. Tegmina not exceeding, and frequently not reaching the apex of abdomen in either sex; venation less evident, texture more corneous; marginal field of tegmina broad and relatively short; anal field more attenuate distad; discoidal field of tegmina relatively narrow, sectors few (average three). Interocular space very broad in both sexes, equal in male to nearly twice occipital depth of eye. Head markings consisting of a dark interocular bar and three transverse face markings. Cerci of male very short and robust. Supra-anal plate of male transverse subtrigonal, without pronounced medio-distal emargination. Female in general appearance very similar to male. (Jamaica.) . . . . *dryas*, new species.

Neoblattella infausta, new species

Plates VI, Figures 1 to 2; VII, Figures 5 and 6

This interesting species has a rather isolated position in the *Lucubrans* Group Superficially it bears much resemblance to *N. dryas*, having short alar appendages and an ovate form, but a more careful comparison shows many features of difference. The pronotum while strongly transverse is subelliptical and lacks the abrupt caudal truncation of *dryas*, the anal field of the tegmina is more normally shaped and the disposition and character of the discoidal sectors of the tegmina are much as in the macropterous *N. grossbecki*, while the facial pattern should not be confused with that of any other species of the genus. We are placing *infausta* before the other members of the group, in a linear sequence, although it probably represents a distinct Hispaniolan phylum, the other species here associated being Jamaican, and in many ways more nearly related. When compared with *N. grossbecki* the pronotal form, the shorter, more lanceolate tegmina and more abbreviate wings, more decided and more elongate proximal spines on the ventro-cephalic margin of the cephalic femora, the somewhat smaller size, the shorter tarsi, and the different facial pattern will aid in separating *infausta*.

The male sex is not known and in consequence comparison with *N. lucubrans* is somewhat difficult. The distinctive color pattern of the latter is, however, sufficient at once to remove *lucubrans* from any possibility of confusion with *infausta*. The pronotal form, that of the tegmina, with the very differently proportioned anal field, and the markedly shorter tarsi of *infausta* may be mentioned as structural differences which are not markedly affected sexually in most species of the genus *Neoblattella*. The present species is widely separated from *N. dryas* and further detailed comparison is unnecessary.

Type.—Female; Haiti, Hispaniola. [Museum of Comparative Zoölogy.]

Size very small (for genus); form depressed elliptical; surface moderately polished.

Head hardly visible cephalad of pronotum when viewed from the dorsum: in outline deeper than wide; interspace between eyes broad, equal to one and one-half times the occipital depth of eye, and very faintly less than that between antennal scrobes: face weakly rounded, hardly inflated; lateral margins of face regularly and appreciably straight convergent ventrad: palpi of the type found in *N. grossbecki*, but with the third and fourth joints more slender in proportion; eyes weakly protuberant laterad, in basal outline as in *grossbecki* but less prolonged ventrad; antennæ at least as long as the body.

Pronotum strongly transverse, subelliptical, greatest length contained one and one-half times in greatest width,[1] the point of greatest width appreciably caudad of the middle: cephalic margin broadly and moderately arcuate, passing broadly and regularly into cephalic half of lateral margins, which are strongly divergent arcuate to the obtusely rounded points of greatest width, caudad of which the lateral margins are oblique subarcuate convergent, passing by a hardly evident angle into the broad, subtruncate caudal margin; disk with a pair of weak, connected impressions cephalad of the middle: in transverse section the pronotum is weakly but regularly arcuate.

Tegmina slightly shorter than body length and surpassing the apex of the abdomen by less than the pronotal length, broad lanceolate, very weakly acuminate distad; greatest width contained slightly more than three times in greatest length: costal margin decidedly and regularly arcuate; sutural margin straight in the greater portion of its length, distad rounding to the blunted and rounded, but in general acute-angulate, apex: marginal field broad, relatively shorter than usual; anal field pyriform, slightly elongate: costal veins twelve to thirteen in number, a number of the distal ones carried by two rami of the discoidal vein; discoidal sectors six in number, the trunk of median vein included in this count; axillary veins five in number. Wings apparently falling faintly short of the tegminal apices, apex of wing damaged; intercalated triangle present but damaged: costal veins proper seven in number, elongate clavate, distal less strikingly so, rami of the discoidal vein carry five additional non-clavate costal veins distad; medio-discoidal area slightly broader than medio-ulnar area, with fewer and more irregular cross-veins and consequently less distinct and regular areolets than in *N. grossbecki:* ulnar vein triramose; axillary vein quadriramose.

Abdomen broad, depressed; tergites unmodified: supra-anal plate transverse, distal margin moderately arcuate, very shallowly and broadly emarginate mesad, the margin with bristle-like hairs similar to but fewer in number than those found in *N. grossbecki*; cerci elongate fusiform, very slender distad, depressed dorsad, rounded ventrad, with ten apparent segments: subgenital plate large, scoop-shaped, mesad broad triangularly produced, the margins straight oblique from the very weak cercal emarginations to the relatively broad, subtruncate apex.

Cephalic femora with the "Type A" spination on ventro-cephalic margin having the proximal spines distinctly longer and more robust than in *N. grossbecki*, three being particularly heavy and subfalcate, the series regularly decreasing in size and length to about the fifth spine from distal end of row, thence slightly increasing in length distad; distal pair of spines very long and prominent, the distal somewhat the longer; ventro-caudal margin of cephalic femora with four spines, one apical in position. Median and caudal femora well spined on ventral margins. Caudal tarsi similar in type to those of *N. grossbecki*, but less elongate. Tarsal claws very finely serrulate ventrad.

General color of head, disk of pronotum, thorax, coxæ and limbs ochraceous-buff; peripheral portions of pronotum, tegmina and wings semihyaline light ochraceous-

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[1] Plate III, figure 5, shows the pronotum somewhat too strongly transverse and broader in proportion to length than is true.

buff (virtually "testaceous"). Head without pronounced maculations; eyes pitch black. Disk of pronotum with an incomplete transverse subelliptical pencilling of prout's brown, which outlines the disk cephalad and laterad but not caudad. A pair of prout's brown blotches, made up of spots and not sharply defined, are placed on the transverse pronotal axis. Wings moderately suffused with prout's brown in the region of the costal veins, this bordered in the same region along the costal margin by a marked, but narrow, band of opaque cream-white. Abdomen above fuscous, narrowly edged laterad and caudad with whitish; below fuscous, irregularly margined with pale ochraceous-salmon, the fuscous of the segments broken up by irregular transverse stripes of pale buckthorn brown; subgenital plate largely pale buckthorn brown. Spines of the general color.

Length of body, 7.8 mm.; length of pronotum, 2.6; greatest width of pronotum, 3.9; length of tegmen, 7.6; greatest width of tegmen, 2.5.

In addition to the type we have before us a single paratypic female from the collection of the American Museum, taken at Port-au-Prince, Haiti, March 5–11, 1922, (F. E. Watson), which shows a few differences from the above description of the type. The interspace between the eyes is somewhat broader, equalling one and three-fourths times the occipital depth of eye; the number of discoidal sectors of the tegmina is five, distad dividing into seven; distal margin of subgenital plate is very shallowly emarginate; interocellar region of face with a transverse arcuate bar of creamy white; venter of abdomen, except for subgenital plate, with each segment margined distad with a broad, poorly defined border of pale ochraceous-buff, the remainder of each segment virtually a tessellate mosaic of mummy brown and ochraceous, without clearly defined disposition, the subgenital plate ochraceous, on its disk with a heavy but rather poorly defined blotch of cinnamon-brown. These differences we feel are purely individual and a sufficient series would demonstrate the occurrence of intermediate conditions.

Neoblattella grossbecki, new species

Plates VI, Figures 3 to 4; VII, Figures 1 to 4

The present species forms with the following *N. lucubrans* a division of the group roughly characterized by having tegmina and wings decidedly surpassing the apex of the abdomen; in the present species this is even true of the female sex, which is unknown in *N. lucubrans*. From *lucubrans* the present species differs chiefly in the more robust palpi, the distal joint of which is broad when seen in extensor aspect, the numerous and straighter axillary veins of the tegmina, in the decided and complicated facial pattern, which is not present in *lucubrans*, in the median section of the ventral surface of the abdomen being dark with lateral section pale, instead of the reverse as in *lucubrans*, and in the much less elongate proximal spines on the ventro-cephalic margin of cephalic femora. With *infausta* and *dryas*, the other species of the group, no detailed comparison is necessary as these species have far shorter tegmina and a quite different general appearance.

Type.—Female; Cinchona, Blue Mountains, St. Andrew Parish, Jamaica. Elevation, 4900 feet. February 18, 1911. (J. Grossbeck; at light.) [American Museum of Natural History.]

Size small (for the genus); form depressed, tegmina and wings surpassing apex of abdomen; surface glabrous.

Head subdepressed, in almost its entire width visible cephalad of pronotum; interocular region in width very faintly narrower than that between antennal scrobes, and equal to one and one-quarter times the occipital depth of eye: lateral margins of face distinctly converging ventrad; greatest length of head faintly greater than greatest width: palpi with third joint straight, moderately slender; fourth joint about three-quarters as long as third, moderately infundibuliform: fifth joint subequal to fourth in length, appreciably inflated and in consequence deeper and broader than fourth joint, the ventral margin gently oblique subtruncate distad to the apex, which is acute in profile and rounded rectangulate seen from the extensor surface: eyes moderately protuberant laterad, elongate reniform in basal outline, prolonged and regularly narrowing ventrad; antennæ damaged.

Pronotum transverse, greatest length contained one and two-fifth times in greatest width, latter slightly caudad of middle: cephalic margin of disk moderately arcuate, regularly passing into the oblique arcuate cephalic portion of lateral margins, which markedly diverge to the broadly rounded point of greatest width, brief caudal section of lateral margins arcuate-subtruncate, passing by faint angulation into the slightly arcuate and broad caudal margin; surface of disk with a shallow, broadly V-shaped depression slightly cephalad of middle: in transverse section the whole pronotum is uniformly and faintly arcuate.

Tegmina elongate lanceolate, slightly longer than body length, greatest width contained in length faintly more than three times, surpassing the apex of abdomen by about length of pronotum: costal margin of tegmina regularly and gently arcuate to near apex, to which the margin is then more strongly arcuate; sutural margin faintly arcuate in area of anal field, straight distad of same to distal fourth, where it is obliquely arcuate to the rounded rectangulate apex: marginal field relatively broad; anal field somewhat elongate, pyriform: costal veins thirteen to fourteen in number, distal ones bifurcate, occasional discoidal veins fork well before apex and sutural branch carries the costal veins: discoidal sectors longitudinal, six to seven in number; axillary veins weakly arcuate, five in number. Wings in repose reaching to tegminal apices, very broad in proportion to length, greatest width contained about one and one-third times in greatest length; immediate apex rounded rectangulate, the general apex subtruncate; intercalated triangle small but distinct, its length not greater than one-seventh that of wing, not projecting: costal veins proper ten in number, briefly and moderately but appreciably clavate, less distinctly so distad, a number of distal rami of the discoidal vein non-clavate; medio-discoidal area slightly broader than medio-ulnar area, with numerous transverse divisions into rectangulate and generally subquadrate areolets; ulnar vein biramose, all reaching the apical margin; axillary vein triramose on costal side of vein, all reaching margin of area.

Abdomen broad, strongly depressed; dorsal surface unmodified; supra-anal plate strongly transverse, narrowing laterad, distal margin subsigmoid on each side and with a broad, rounded emargination mesad, the sections laterad of this emargination rounded sublobate, most of the margin other than the emargination with spaced, bristle-like hairs, lying in the same plane as the plate; cerci elongate fusiform, narrow, deplanate dorsad, rounded ventrad, twelve joints apparent, distal one very slender; subgenital plate large, broad, scoop-shaped, cercal emarginations distinct, median section of plate trigonal, the sides regularly straight convergent from cercal emarginations to the relatively narrow arcuate-truncate apex.

Cephalic femora with ventro-cephalic margin having the proximal spines relatively short and the gradation in size distad very slight and regular, the two distal spines of series showing a slight increase in length over those adjacent, larger spines of this series with no evident serrulations on distal face; distal spines two in number, the terminal one-half again as long as the more proximal one: ventro-caudal margin with two to three spines on distal half, one apical in position. Median and caudal femora with ventral margins regularly and strongly spined. Caudal tarsi elongate, with metatarsus considerably surpassing remainder combined, biseriately spined on ventral surface, with very small apical pulvillus: second joint of caudal tarsus similarly spined, with a similar but more elongate pulvillus; third and fourth joints with pulvilli, on the third apical, on the fourth covering most of article, acute and produced. Arolia present on all tarsi; tarsal claws very finely serrulate ventrad, no evident shoulder or preapical flange on this margin.

General color pale ochraceous-buff, opaque on the pronotal disk, head, palpi and coxæ, translucent to transparent on tegmina and most of limbs. Head with a broad mummy brown band between eyes, weakened dorsad, separated by a clear and sharply defined narrow line of the base color from an elongate diamond-shaped bar of mummy brown ventrad (above antennal base), below which on the face follows a band of the base color, a transverse blotch of mummy brown (below antennal bases), an arcuate bar of the base color and an incomplete arcuation of mummy brown; eyes blotched fuscous and mummy brown. Pronotum with lateral sections hyaline, faintly washed with the general color. Tegmina with marginal field colored as lateral sections of pronotum. Wings hyaline faintly washed with general color, veins pencilled in dresden brown. Abdomen dresden brown, suffused mesad on ventral surface with fuscous, the lateral sections of ventral surface washed, the usual depressions pointed, and much of the margin of the subgenital plate pencilled with fuscous; dorsal surface of abdomen fuscous, with a medio-proximal section paling to pale ochraceous-buff. Limbs with tibial spines pale tawny, darkened distad; point of insertion of the larger femoral and tibial spines marked with mummy brown, which also weakly lines the ventral margins of the median and caudal femora and the dorsal margin of the cephalic femora.

Length of body, 9.9 mm.; length of pronotum, 2.6; greatest width of pronotum, 3.6; length of tegmen, 10.7; greatest width of tegmen, 3.5.

The type is the only adult of the species seen, but we have before us an immature male and two immature females, taken by the senior author in the mountain forest between Pleasant Hill and St. Helens Gap, Blue Mountains, 4400–4780 feet, July 24 and 25, 1923. These were secured from epiphytic bromeliads and hollow bases of dead tree fern fronds. Two of these specimens are in the instar preceding maturity, the third in its antecedent. The face and dorsal and ventral surfaces of the abdomen show the distinctive color features of the species.

We take pleasure in dedicating this species to its collector, the late John Grossbeck, as a slight tribute to a promising brother entomologist, whose work was cut short by an untimely death.

Neoblattella lucubrans,[1] new species

Plate VI, Figures 5 to 8

A long-winged species that superficially shows much resemblance to *N. grossbecki*, but which, on the basis of opposite sexes, differs principally in the features given in the key and in the diagnosis of the latter species. While the localities from which the two species are described are very near one another, there is no possibility of the two representing sexes of the same species, the palpal, tegminal and cephalic and abdominal coloration features being of such character as to prevent this being the case. The recognition of immature material of *grossbecki* taken in July may also indicate it is probably a species maturing later in the season than *lucubrans*.

TYPE.—Male; Pleasant Hill, Blue Mountains, Jamaica. Elevation, 3635 feet. July 30, 1923. (Rehn; attracted to light of gasolene lantern.) [Academy of Natural Sciences of Philadelphia, Type No. 5415.]

Size somewhat larger than in *N. grossbecki;* form and surface in general similar.

Head but narrowly visible cephalad of pronotum when seen from dorsum; in cephalic aspect the head is pyriform, greatest depth slightly greater than width across eyes; occipital interspace between eyes broad, subequal to occipital depth of eye; interspace between ocellar spots about one-fourth wider than occipital interspace between eyes; lateral margins of face ventrad of eyes nearly straight convergent ventrad. Eyes moderately prominent laterad, extending ventrad but slightly below ventral margin of antennal scrobes. Palpi very slender, moderately elongate, compressed, third and fourth joints subequal in length, latter weakly infundibuliform; distal joint about four-fifths the length of fourth joint, moderately inflated, its ventral margin, as seen in profile, largely weak arcuate, seen from extensor surface this joint is appreciably compressed.

Pronotum of the form and proportions found in many species of the genus, ovate-subtrapezoidal, greatest length contained one and two-fifths times in greatest width, which is somewhat caudad of the middle; cephalic margin moderately arcuate, passing through broad arcuations into the oblique and weakly arcuate lateral margins, which broadly rounding over point of greatest width pass by a slightly obtuse angulation into the faintly obtuse-angulate caudal margin; surface of pronotum with distinct indications of the supra-cephalic bullation of pronotal disk as found in *N. grossbecki.*

Tegmina and wings elongate, surpassing apex of abdomen by one and one-third times pronotal length. Tegmina lanceolate, greatest width contained three and three-fifths times in greatest length of same: costal margin moderately arcuate in proximal two-fifths, thence straight to near apex, where it narrowly rounds; sutural margin virtually straight except for brief arcuate proximal section, distad for short distance oblique subarcuate to narrowly rounded apex: proportions of fields as in *N. grossbecki* except that anal field is more elongate pyriform: costal veins more numerous, nineteen to twenty in number, counting all the distal rami; discoidal sectors seven in number (including main median vein); axillary veins six in number, straighter than in *N. grossbecki*. Wings with intercalated triangle small, narrow; costal veins twelve in number, proximal nine elongate clavate; ulnar vein bifurcate near middle, distad with two short rami, all complete and reaching distal margin: medio-discoidal and medio-ulnar areas virtually subequal in width taken in their entirety; interspace between ulnar vein and its proximal branch broader than either of above-mentioned fields, its cross-veins producing subquadrate areolets.

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[1] In allusion to the action of the species in coming to light.

Supra-anal plate transverse, distal margin arcuately bilobate, median emargination very broadly V-shaped, ventral surface of distal margin with series of chætiform hairs. Subgenital plate transverse, lateral sections of distal margin obliquely subtruncate convergent; interstylar section of distal margin with its median portion having a weakly elevated subtruncate transverse thickening, which is cicatriform in character; stylar sockets broad, transverse, little excavated at the alveolus: styles very short, transverse lamellæ, seen in ventral aspect they are more than twice as broad as long, dorsal surface and distal margin with closely-set shagreenous teeth, which on distal margin as seen in ventral aspect radiate over the periphery; in caudal aspect the lateral portions of distal margin of subgenital plate immediately laterad of styles are seen to be thickened and supplied within anal cavity with numerous chætæ, scattered chætæ are also found on distal margin and ventral surface of subgenital plate. Cerci moderately elongate, tapering in distal half.

Cephalic femora with proximal spines of ventro-cephalic margin large, three or four in number, sharply contrasted with the far shorter spines of more distal portion of series; distal pair of spines of same margin elongate, subequal: ventro-caudal margin of cephalic femora with four large spaced spines, one of which is subapical. Caudal tarsi elongate, slender, in large part subcompressed; caudal metatarsus forming nearly two-thirds of length of entire tarsus; ventral surface of metatarsus and following joint biseriate spinulose, a sparser series of spinules is present on distal two-thirds of dorsal margins of metatarsus and at its distal extremity, a few similar spinules distad on following two joints; pulvilli present distad throughout. Arolia large. Tarsal claws equal, ventral margin of same finely serrulate, with no preapical diastema or emargination.

Disk of pronotum ochraceous-orange, virtually unmarked except for a median pair of diverging, comma-like spots of fuscous; lateral sections of pronotum yellowish hyaline. Tegmina washed with very pale buckthorn brown except for the nearly clear hyaline marginal field and portion of scapular field adjacent to costal margin; all tegminal veins lined with dresden brown, except portions of costal veins in hyaline section of marginal field and in vicinity of the forking of the median vein. Head with occiput, face, mouth-parts and antennæ ochraceous-orange, face unmarked; interocular dark bar fuscous, broad, equal in width to occipital depth of eye, ventral margin concave; palpi pale dresden brown, clouded with mummy brown. Eyes dark prout's brown. Ventral surface with broad dark (mummy brown) lateral bars extending from prothoracic trochanters, over external section of mesopleura and metapleura, on latter also reaching as a line to apex of coxæ, and as broad abdominal bars, each a third as wide as the abdomen, to the subgenital plate, where the two meet and fuse; median pale portion of venter of abdomen narrower than dark lateral bars, dull ochraceous-orange; laterad on the abdomen the dark bars are narrowly edged with light buff; subgenital plate with a pale spot of pale ochraceous-orange at each stylar base and indications of another meso-distad. Cerci pale ochraceous-buff proximad and preapically washed with prout's brown, more decided on dorsal surface. Dorsal surface mummy brown, very narrowly edged laterad with light buff. Coxæ light buff, remainder of limbs dull ochraceous-orange, spines concolorous.

Length of body, 11.2 mm.; length of pronotum, 2.7; greatest width of pronotum, 3.8; length of tegmen, 13; greatest width of tegmen, 3.6.

The type of this most interesting species is unique. In every way *lucubrans* is a very distinct form, with a striking and markedly distinctive coloration. We have no information regarding the species additional to that given above for the type.

Neoblattella dryas,[1] new species

Plate VI, Figures 9 to 12

A very distinct and peculiar bromeliadicolous species, which can at once be separated from the other members of the group by the semicircular form of the pronotum, the caudal margin of which is quite strongly transverse, the relatively short, lanceolate tegmina, which have strongly longitudinal discoidal sectors and a greatly extended anal field, a very broad interspace between the eyes in both sexes, very short and robust cerci, relatively short tarsi and characteristic male genitalia.

TYPE.—Male; Morces Gap, Blue Mountains, Jamaica. Elevation, 4980 feet. July 21, 1923. (Rehn; from dead bases of tree fern fronds.) [Academy of Natural Sciences of Philadelphia, Type No. 5416.]

Size small (for genus); form elliptical, alar organs not surpassing apex of abdomen; surface dully polished.

Head but narrowly evident cephalad of pronotum when seen from dorsum; seen in cephalic aspect head outline is subpyriform, greatest breadth across eyes subequal to depth of head, ventral portion of head regularly narrowing ventrad of eyes: interspace between eyes very broad for male sex, subequal to interspace between antennal scrobes, one and two-thirds times as great as occipital depth of eye. Palpi slender, moderately elongate; penultimate joint slightly shorter than antepenultimate joint, weakly infundibuliform; ultimate joint subequal to penultimate in length, shallow, hardly compressed.

Pronotum relatively large, in general form virtually semicircular with a trapezoid tendency, due to flattening of the cephalic margin, moderately transverse, greatest length contained slightly more than one and one-half times in greatest width, which is virtually at caudal margin: cephalic margin arcuato-truncate, nearly equal to one-half of greatest width of pronotum, rounding laterad into the caudad diverging, moderately arcuate lateral margins; caudo-lateral angles narrowly rounded subrectangulate; caudal margin arcuato-truncate: in transverse section disk of pronotum is moderately arcuate, lateral sections moderately deflexed, weakly concave.

Tegmina moderately acute lanceolate, reaching to but not surpassing apex of abdomen, greatest width contained two and two-thirds times in greatest length of same: costal margin arcuate, slightly more flattened proximad than distad; apex narrowed, rounded acute-angulate; sutural margin nearly straight: marginal field very short and broad, by no means reaching as far distad as apex of anal field; scapular field in width about equal to one-half that of entire tegmen; anal field quite elongate pyriform, produced distad of middle of tegmen; costal veins nine to eleven in number; discoidal sectors of all character but three in number, markedly longitudinal; anal sulcus prolonged distad in a subsigmoid fashion, outlining the unusual extension of anal field; axillary veins four in number. Wings[1] reaching to apex of tegmina when in repose, when spread seen to be non-functional as organs of flight, radiate field being poorly developed and incapable of full or normal expansion, its texture somewhat coriaceous; general form of spread wing elongate ovate, width contained about twice in length, that of radiate field but slightly greater than that of anterior field; apex rounded rectangulate, peripheral margin of radiate field appreciably crenulate: costal veins simple, spaced, weakly clavate; ulnar vein simple, unbranched: medio-discoidal area faintly wider than medio-ulnar area.

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[1] I. e., a wood nymph, from its forest habitat.

Abdomen with three distal tergites appreciably narrower than other tergites; antepenultimate tergite almost hidden under preceding tergite, with distal margin broadly concave, laterad transverse truncate; penultimate tergite with lateral margins subparallel, distal margin transversely truncate with a faint median emargination; supra-anal plate transverse subtrigonal, greatest length contained about three times in greatest width, margin slightly concave on lateral sections, very faintly bilobate on median produced section, several large chætæ projecting caudad from this portion. Cerci short, robust, depressed, fusiform, composed of approximately ten articles (proximal ones not sharply defined), median and distal articles sharply defined, those distad regularly reducing in size, apical one styliform but not exceeding its predecessor in length. Subgenital plate in section subdeplanate mesad with lateral portions obliquely ascending and diverging dorso-laterad, in ventral aspect lateral margins of plate are seen to be obliquely subsigmoid, converging to region of stylar bases, the latter well seated within margin of plate, intervening section of margin biconcave with a median brief labiate production, which, as well as lateral surfaces of plate, possesses scattered erect chætæ; styles short, transverse lamellations, hardly projecting distad of adjacent lateral sections of plate margin, subdepressed, distad armed with a number of mesad directed, recurved, claw-like teeth.

Cephalic femora with ventro-cephalic margin armed with spines which markedly decrease in size and length distad; ventro-caudal margin with two spaced spines meso-distad in addition to apical one: caudal tarsi moderately long, metatarsus subequal in length to remaining tarsal joints, ventral surface biseriate spinulose; apical pulvilli present throughout; arolia large. Tarsal claws equal, ventral margin with no apical diastema, mesad crenulato-denticulate.

ALLOTYPE.—Female; same data as type, but date is July 29, 1923, and the series secured then was taken from dead tree fern frond bases and from bromeliads. [Academy of Natural Sciences of Philadelphia.]

Differing from the above description of the male in the following noteworthy features.

Interspace between eyes slightly greater than that between antennal scrobes, faintly more than twice as great as occipital depth of eye.

Tegmina faintly less produced distad, with apex blunter, less acute.

Abdomen regularly narrowing distad from middle: antepenultimate tergite largely hidden under preceding tergite, more shallow concave than in male; penultimate tergite with margin largely transverse truncate but weakly oblique laterad; supra-anal plate as in male. Cerci essentially as in male. Subgenital plate large, simple, between infra-cercal emarginations with margin broadly arcuate, weakly and narrowly flattened mesad.

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[1] The features of the wing have been taken from paratypic material, as to save possible damage of the type it has not been spread.

General color of dorsum light ochraceous-buff to ochraceous-buff, lateral portions of pronotum of the same general tone but semi-hyaline, tegmina very similar, but more opaque in fields other than the marginal; general color of venter much as of dorsum except for details here stated. Head with base color showing a tendency toward ochraceous-orange; pattern of dresden brown to mummy brown indicated as follows: a broad interocular bar, clearly defined ventrad, less sharply margined dorsad; a transverse bar, situated at dorsal margin of antennal scrobes, narrow laterad, broad mesad, varying in strength and solidity, occasionally coalescing mesad with a more ventral transverse interantennal marking which is arcuate and occasionally breaks into four component parts, very rarely these two bars are almost solidly combined; a broadly V-shaped marking unites ventral portions of antennal scrobes, which are also largely bordered with the same color, this V-shaped marking varying to subobsolete and occasionally markedly interrupted mesad. Eyes mars brown to mummy brown. Antennæ with the exception of several proximal joints washed with cinnamon brown. Pronotum ranging from unmarked in the one extreme to the other bearing an irregular, poorly defined pair of dark bars or more properly clouds, which in the more extreme condition join at the cephalic margin, where a transverse bar of prout's brown is indicated, the dark bars, when present, more pronounced cephalad and caudad than elsewhere. Dorsal surface of abdomen washed with prout's to mummy brown to a variable degree, occasionally largely of the general color, with a reduced infuscation distad. Venter of abdomen with a pair of intermarginal dark (prout's brown to mummy brown) lateral bars, which range from broad and continuous, reaching to the penultimate sternite (♂) or lateral bases of the subgenital plate (♀) and laterad involving much of the lateral margins of the sternites themselves, to the other extreme where these bars are broken into subtrigonal blotches on each segment; a median, generally obscure bar of similar color is indicated proximad, which on the subgenital plate frequently reappears in a broad infuscation of the whole medio-distal section; occasionally the distinction of median and lateral bars becomes less evident and the usual intervening pale area of the base color is clouded and with little definition. Cerci of the general color, frequently with a proximal darkening, a preapical dark annulus and a very small dark tip; occasionally they are unmarked except for the proximal darkening. Coxæ washed proximad with prout's brown to mummy brown; tibiæ with vicinity of spine bases and narrow complete or incomplete distal annuli of the same color.

The immature specimens show essentially the same colorational features as the adults. The pronotum is always bilineate, these continued over the other thoracic nota and even the tergites of the abdomen, so that the bilineate condition is pronounced and distinctive. The facial markings are frequently broken mesad and the venter of the abdomen is more universally dark, with the bars of the adult much less evident or definite.

The following measurements of representative individuals show that considerable size variation or plasticity is present in both sexes and regardless of exact locality. It is equally evident that the tegmina and pronotum vary considerably in their relative proportions.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Morces Gap, Jamaica, type........	9.6	2.7	4.2	7	2.5 mm.
♂, Morces Gap, Jamaica, paratype...	9.5	2.5	3.8	6.8	2.5
♂, Morces Gap, Jamaica, paratype...	9.8	2.4	3.8	6.5	2.5
♂, West slope of Sir John Peter Grant Peak, Jamaica, paratype...............	9.8	2.8	4.3	8.2	2.8
♂, Between Pleasant Hill and St. Helens Gap, Jamaica, paratype...............	9.2	2.6	4	6.6	2.7
♀, Morces Gap, Jamaica, allotype.....	9.1	2.5	4	7	2.6
♀, Morces Gap, Jamaica, paratype...	10	2.7	4	6.8	2.6
♀, Morces Gap, Jamaica, paratype...	8.8	2.5	3.7	6.2	2.5

We have before us a most interesting series of fourteen adults, in addition to the type and allotype, and fifteen immature individuals, all taken in the Blue Mountains of Jamaica by the senior author. All of the additional adult specimens we are considering paratypes. The additional data of the specimens before us are as follows:

Morces Gap, elevation 4980 feet, July 19, 1923, (from epiphytic bromeliads), 3 immature individuals; July 21, 1923, (same habitat notes as type), 1♂, 2♀, 1 immature individual; July 29, 1923, (numerous in bromeliad and in dead tree fern bases), 1♂, 1♀, 2 immature individuals; July 30, 1923, (under bark of *Vaccinium*), 1♀, 1 immature individual. West slope of Sir John Peter Grant Peak, elevation 5700 feet, July 26, 1923, (from bromeliads in dense ridge type of forest), 1♂, 9 immature individuals. New Haven Gap, elevation 5600 feet, July 26, 1923, (in bromeliads), 2 immature individuals. Between Pleasant Hill and St. Helens Gap, elevation 4650 feet, July 24, 1923, (from bromeliads), 1♂.

The immature specimens represent at least the two instars preceding maturity, both of which were taken at Morces Gap on July 29. One of the females from Morces Gap, July 29, bears a protruding oötheca, which is carried with the carina dorsad.

The male subgenital plate is seen to vary appreciably in the exact form of the inter-stylar portion of the distal margin, also the distance apart of the styles. The margin ranges in form from that described in the type, on one hand, to one which is regularly concave with no median protuberance of any sort and, on the other hand, to a phase lacking a median protuberance and very broadly V-emarginate, but with distinct juxta-stylar flanges bordering the concavity laterad. The general form, however, is in all sufficiently distinctive to show the specific identity of the material.

The species is a most secretive one, to be found only after patient and continued searching of bromeliads, in bark crevices and similar hiding places in the mountain forest, and was not encountered by us below 4650 feet elevation. In addition all the specimens taken were from areas which are regularly bathed in trade-wind driven fog, except the single one taken July 24, which was in a bromeliad on a tree in an isolated and exposed forest patch topping a ridge, and thus receiving more fog than areas immediately below, or even spots as high but more protected by the drier leeward slopes of encircling ridges from the main Blue Mountain chain.

Blattella germanica (Linnæus)

[*Blatta*] *germanica* Linnæus, 1767, 'Syst. Nat.,' 12th Ed., I, p. 668. Denmark.

Cuba.—Pinar del Rio, Province of Pinar del Rio, IX, 9–24, 1913, (Leng; in hotel), 1 ♀.

Hispaniola.—Azua, Province of Azua, Dominican Republic, III, 13, 1913, (P. G. Russell), 1 ♀, [U. S. N. M.].

Grenada.—June, (Aug. Busck), 1 ♂, [U. S. N. M.].

This cosmopolitan domiciliary pest has been recorded from Cuba (by Serville, Guérin, Brunner, Walker, Saussure, Gundlach and Bolivar); Porto Rico (Gundlach, Seín, and Wolcott), and specifically Fajardo (Rehn) and Condado (Wolcott) in that island; Kingston, Jamaica (Cockerell), and Barbados (Caudell). Gundlach says it occurs all over Cuba and Cockerell states it is troublesome in houses in Jamaica. Seín considers it a veritable plague in Porto Rico.

CHROMATONOTUS Hebard

As far as present knowledge is concerned, this genus of small, usually strikingly marked blattids is composed of six species, distributed from Guatemala to Colombia, east to Trinidad and north in the Lesser Antilles to Grenada. We have no definite information as to the occurrence of the genus at localities on the north coast of South America, but it doubtless occurs in suitable environments and probably has a more extensive range to the southward. Two of the species are known from Panama (*heterus* and *lamprus*), one from Guatemala (*agunæ*), one from Colombia (*andagoyæ*), one solely from Trinidad (*infuscatus*), and the remaining species from Trinidad and Grenada (*notatus*).

Hebard when describing the genus has given some useful notes on its relationship and characters.[1]

Chromatonotus notatus (Brunner)

P [*hyllodromia*] *notata* BRUNNER, 1893, Proc. Zoöl. Soc. London, p. 602, Pl. LII, figs. 1*a* and 1*b*. ♂, ♀; St. George's and Balthazar, Grenada.

No additional information is at hand regarding the occurrence of this species in the West Indies.

NYMPHODROMIA,[1] new genus

A member of the Group Blattellæ, having some affinity with *Dendroblatta* Rehn, but it shows tendencies toward the aberrant genus *Euphyllodromia* Shelford, which it may link with the Blattellæ. It agrees with *Euphyllodromia* principally in having the head broad and depressed, the pronotum strongly transverse elliptical and the humeral trunk of the tegmina sigmoid in character. From *Euphyllodromia* the present genus differs principally in having the interspace between the eyes very broad, the ulnar vein and the sutural ramus of the median vein of the tegmina not angled, the sectors of the discoidal field of the tegmina more numerous, in the elongate, simple palpi, the spout-shaped male subgenital plate, the entire subgenital plate of the female and the "Type A" spination of the ventro-cephalic margin of the cephalic femora. From *Dendroblatta* the new genus can be readily distinguished by the greater interspace between the eyes, the elongate and simple palpi, the fewer and longitudinal sectors of the discoidal field of the tegmina, by the enlarged costal veins of the wing, the fewer ulnar rami of the wings, symmetrical male subgenital plate and the spination of the ventro-cephalic margin of the cephalic femora.

GENERIC DESCRIPTION.—Form depressed. Head strongly depressed and transverse; occiput straight transverse; face with lateral margins convergent ventrad; palpi simple. Pronotum strongly deplanate, transverse, sub-elliptical, lateral portions hyaline. Tegmina elongate lanceolate, surpassing apex of abdomen; scapular field very broad; costal veins regular; discoidal sectors longitudinal; ulnar vein not angulate. Wings with small intercalated triangle present; costal veins elongate clavate; ulnar vein complete tri- or quadriramose; axillary vein triramose on peripheral side. Abdomen without marked surface modification; supra-anal plate of male and female transverse, arcuate produced mesad; subgenital plate of male with median shute-shaped process; styles specialized: subgenital plate of female produced and flattened mesad. Cephalic femora slender; ventro-cephalic margin armed with "Type A" spination; ventro-caudal margin spined: median and caudal femora with genicular spines; caudal tarsi with proximal joints subequal to twice the length of remainder, biseriately spinulose ventrad, with small apical pulvillus. Arolia present. Tarsal claws serrulate mesad on ventral surface.

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[1] 1920, Mem. Amer. Entom. Soc., No. 4, pp. 44–46.

[2] From *νυμφη*, *μ*nymph and *δρομεμs*, a runner.

Genotype.—*N. miranda*, new species.

Nymphodromia miranda, new species

Plate VII, Figures 7 to 13

Type.—Male; San Francisco Mountains, thirteen kilometers north of San Cristobal, Province of Santo Domingo,[1] Dominican Republic, Hispaniola. September, 1905. (August Busck.) [United States National Museum.]

Size rather small; surface in general weakly polished.

Head appreciably visible cephalad of pronotum for its full width; occipital line, when seen from dorsum, straight transverse: head in outline trigonal, the greatest width across eyes contained one and one-fifth times in greatest depth (i. e., occiput to labrum) of head; lateral margins of face ventrad of eyes straight convergent to near the maxillary palpal bases; interspace between eyes equal to the transverse dimension of eye when seen from occipital aspect; face distinctly but not abruptly deplanate, transversely weak arcuate, nearly straight in profile: palpi with third joint moderately slender and elongate; fourth joint equal to three-quarters of the length of third joint, straight, moderately infundibuliform; fifth joint slightly longer than fourth joint, moderately inflated, lanceolate when seen from extensor surface, in profile with ventral outline arcuate and dorsal line straight in proximal three-quarters, apex in profile acute angulate, concavity of flexor surface deep; eyes prominent laterad, strongly arcuate in outline; basal outline weakly reniform, narrowing ventrad: antennæ surpassing the body in length, proximal joint large, slightly arcuate.

Pronotum strongly deplanate, very weakly arcuate transversely, in form elliptical, transverse, greatest length contained one and two-fifths times in greatest width of same; latter placed very slightly caudad of middle: cephalic margin moderately and regularly arcuate, regularly passing into the lateral margins, which are strongly arcuate, the point of greatest width not angulate in the least; caudo-lateral angle rounded obtuse; caudal margin truncate: disk of pronotum with a very weak U-shaped impression cephalad and weak undulations of the surface caudo-laterad.

Tegmina surpassing the apex of the supra-anal plate by the length of pronotum, elongate lanceolate, greatest width contained three and one-fifth times in greatest length: costal margin arcuate proximad, nearly straight thence distad and rather shortly arcuate to the rounded rectangulate apex; sutural margin in large part straight, in distal third obliquely sub-arcuate to the apex, which is nearer the costal than the major portion of sutural margin: marginal field moderately broad, relatively elongate; scapular field very broad, at faintly proximad of middle of tegmen being broader than discoidal field at same point; anal field elongate pyriform, equal to slightly more than two-fifths of tegminal length: costal veins fifteen in number, largely straight oblique in direction, the distal five being rami of the preceding costal vein; discoidal sectors longitudinal, principals numbering five, two of which are bifurcate distad; ulnar vein, here counted as a discoidal sector, of the usual blattellid type; axillary veins five in number. Wings moderately elongate, greatest width contained one and two-thirds times in greatest length of same; costal margin straight in the region of the costal veins, arcuate distad to the narrowly rounded rectangulate apex, area of the axillary vein with margin weakly but appreciably arcuate: intercalated triangle small, but distinct, its greatest length about one-seventh of length of wing on axis of anal vein: clavate costal veins seven in number, strongly oblique, the clavations elongate and marked, non-clavate costal veins seven in number, on distal multiramose rami of the discoidal vein: medio-discoidal area subequal in width to medio-ulnar area, with numerous (fourteen plus) cross-veins forming subquadrate areolets; medio-ulnar area without complete cross-veins; ulnar vein triramose, all complete; axillary vein triramose on peripheral side.

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[1] See p. 11, footnote 1.

Abdomen strongly depressed, deplanate; dorsal surface unmodified except for slight median fold distad on penultimate tergite: supra-anal plate transverse, moderately arcuate produced mesad, a faint suggestion of median emargination present: cerci composed of ten segments, elongate, slightly fusiform, depressed, very slender distad: subgenital plate broad at base and produced meso-distad into a shute-like process, which is as long as the remainder of the plate, into which, by the diverging, concave lateral margins, it passes; distal margin of the median process broadly obtuse-angulate emarginate, rounding laterad; styles inserted at the lateral angles of the median process, large, longer than distal width of median process, falcate distad, the apex recurved spinose, and with two or more similar spines on dorso-lateral surface; genital hook figured.

Cephalic femora slender, straight, subequal, with ventro-cephalic margin bearing "Type A" spination, the proximal spines relatively short, weakly curved; apical spines on ventro-cephalic margin two in number, large, the distal the longer; ventro-caudal margin with five long spines; no dorso-genicular spine present. Median and caudal femora with ventral margins well and regularly armed, decided dorso-genicular spines present. Caudal tarsi very elongate and slender; proximal joint almost twice as long as the remaining joints together, biseriately spinose on ventral surface, with a small distal trigonal pulvillus; second joint similarly spined with more extensive pulvillus; third joint[1] with an elongate, acute pulvillus. All tarsi with large arolia; tarsal claws with median section of ventral margin serrulate.

Allotype.—Female; San Francisco Mountains, thirteen kilometers north of San Cristobal, Province of Santo Domingo,[2] Dominican Republic, Hispaniola. August 29. (August Busck.) [United States National Museum.]

Characters as in male, except for the following noteworthy differences.

Interspace between eyes very slightly broader than in male.

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[1] This is really the fourth joint, as this limb has the four- instead of normally five-jointed condition. The opposite tarsus is incomplete, but the allotype shows that the large, elongate pulvillus is that of the fourth joint, while that of the true third joint is of similar size but more rounded, covering less of the joint on account of the greater size of the latter.

[2] See p. 11, footnote 1.

Tegmina surpassing the apex of the subgenital plate by slightly more than the length of the dorsal surface of the head and pronotum combined; principal discoidal sectors six in number, one or more furcate distad.

Abdomen with fold on penultimate dorsal segment present: supra-anal plate of type found in male but slightly more arcuate and produced, the margin with a decided, broad, obtuse-angulate emargination mesad, the lobes laterad well rounded: subgenital plate broad, broadly produced mesad between the decided cercal emarginations, this production decidedly depressed, its margins laterad slightly curved dorsad, margin of production arcuate with a slight median flattening and a very faint, broad, median tendency toward emargination.

General coloration of the dorsal surface of the body, the head, the disk of the pronotum and a suffusion of the anal and discoidal fields and sutural portion of the scapular field of the tegmina ochraceous-buff (♀) to between ochraceous-orange and ochraceous-tawny (♂). Ventral surface and limbs light ochraceous-buff (♀) to the general color (♂). Head with the occiput and interocular space washed with orange chrome (♂) to apricot orange (♀), a narrow, transverse, weakly arcuate line of light ochraceous-buff present below ocellar spots; upper face weakly washed with color of occiput; eyes mottled fuscous and dresden brown; antennæ with proximal joint of general color, similar distad in female, in male suffused with fuscous, paling distad. Pronotum with broad lateral areas hyaline. Tegmina with marginal field and costal portion of discoidal field hyaline; normally covered section of right tegmen distinctly infuscate in male sex. Wings of male rather heavily infuscate, particularly the distal section of the axillary field and the periphery of the infuscate portion of the anterior field; principal and radiate veins heavily infuscate; area of the clavate portions of the costal veins and narrower margin extending about to the apex and to the intercalated triangle, yellow ocher. Wings of female with infuscation evident only in radiate field and there much weaker than in male, remainder with weak ochraceous wash, the veins of that portion pencilled with yellow ocher, those of radiate field weakly pencilled with fuscous, no clearly cut yellow ocher border present. In female sex the supra-anal plate and distal margin of distal tergite (allotype) or the greater portion of distal tergites (paratype) are washed with mummy brown.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, type	10.2	2.5	3.5	11	3.4 mm.
♀, allotype	9.7	2.6	3.5	11.4	3.4
♀, paratype	9	2.6	3.6	11	3.3

In addition to the type and allotype we have before us a paratypic female, bearing the same data as the type and from the same collection. The only features of variation noted in the three specimens which call for comments are; that in the allotype the clavate costal veins of the wings number eight, in the paratypic female the non-clavate wing costal veins number five, and the ulnar vein of the wing possesses four rami, the extra one short and close to the end of the vein.

PSEUDOSYMPLOCE, new genus

This genus belongs to that aggregation of genera of the Ischnopteræ possessing biseriate or "Type B" spination on the ventro-cephalic margin of the cephalic femora, although it has a strong general resemblance to *Symploce*, which belongs in the uniseriate or "Type A" section of the group. The other American genera with which it would be associated are *Parcoblatta* Hebard, *Ischnoptera* Burmeister and *Nelipophygus*, here described. The structure of the male abdomen is distinctive, its dorsal surface being but weakly specialized on the sixth tergite, with the caudo-lateral angles of the tergites simple, while the supra-anal plate of the same sex shows very marked and characteristic developments. The male subgenital plate and styles are in general similar to the type found in *Ischnoptera*. The divided discoidal vein of the wing strongly suggests the otherwise quite different *Symploce*.

The combination of a divided alar discoidal vein, bilobulate metanotum, hardly specialized sixth and seventh abdominal tergites in the male, a deeply emarginate male supra-anal plate with a pair of digitiform appendages and biseriate spination of the ventro-cephalic margin of the cephalic femora may be said to be characteristic of the genus.

GENERIC DESCRIPTION.—Fully winged in both sexes. Interocular space equal to (♀) or distinctly less than (♂) occipital depth of eye. Head pyriform in outline. Palpi with fifth joint nearly one and one-third times as long as fourth joint. Pronotum weakly transverse, trapezate-ovate in outline; distinct diverging impressions on disk; lateral portions of pronotal disk deflexed. Tegmina and wings surpassing apex of abdomen. Discoidal sectors of tegmina longitudinal; discoidal vein of tegmina bifurcate. Wing with distinct but small intercalated triangle; costal veins of wing non-clavate; discoidal vein of wing bifurcate: ulnar vein with three complete and three to five incomplete rami; axillary vein triramose. Caudal margin of metanotum with a pair of median, diverging semi-membranous digitiform lobules, much as in *Pseudoderopeltis*. Median segment unspecialized. Sixth abdominal tergite of male but slightly specialized. Supra-anal plate of male emarginate mesad: subgenital plate of female entire. Cephalic femora with ventro-cephalic margin armed with "Type B" spination, i. e., a number of large proximal spines, followed distad by a sharply differentiated series of spinulations, at apex of same margin are three large spines. Tarsi five jointed: caudal metatarsus larger than remaining joints; pulvilli on four proximal joints apical; arolia present: tarsal claws equal, non-specialized.

GENOTYPE.—*P. schistopyga*, new species.

The genus is known to us from Jamaica and Hispaniola and probably it also occurs in Cuba, as a species described from that island by Bolivar as *Ischnoptera excisa* appears to be a member of the present group. However, without material we cannot place the Cuban insect in a key, so the one presented below is based solely on the species before us. We have given on a subsequent page (p. 108) some comments on *excisa*, drawn from Bolivar's description.

The two species before us are distinguishable as follows.

Form more robust. Supra-anal plate of male having its median emargination no broader than deep, its greatest median width distinctly less than its lateral length, including total length of lateral process; latter more robust and separated from cercal alveoli by an intervening section of margin of the plate. Subgenital plate of male with median section less produced; styles short and less elongate. (Hispaniola.)..*elongata* (Beauvois).

Form more slender and elongate. Supra-anal plate of male having its median emargination much broader, wider than its lateral length, including total length of lateral process; latter less robust and in contact with cercal alveoli. Subgenital plate of male with median section more produced; styles more elongate. (Jamaica.) *schistopyga*, new species.

Pseudosymploce elongata (Beauvois)

Plates VII, Figures 14 to 17; IX, Figures 1 to 4

Blatta elongata BEAUVOIS, 1805, 'Ins. Rec. Afr. Amér.,' p. 183, Orth. Pl. *ib*, fig. 5. Apparently ♂; Santo Domingo.

HISPANIOLA.—Port-au-Prince, Haiti, elevation about 300 feet, I, 15–23, 1922, (F. E. Watson), 2♂; III, 21–29, 1922, (F. E. Watson), 1♀; 1910, (G. Lion), 1♂, [Hebard Collection]. San Francisco Mountains, thirteen kilometers north of San Cristobal, Province of Santo Domingo,[1] Dominican Republic, IX, 1905, (A. Busck), 1♂, [U. S. N. M.]. San Lorenzo, Province of Samaná,[2] Dominican Republic, VI, 27–29, 1915, (Watson; taken at light), 1♀.

Allowing for the roughness of the figure and the lack of definiteness in the description, we feel convinced that Beauvois had before him a member of this genus, and in all probability the present species, which is the only one of the genus known from Hispaniola.

In order, however, that the student may have a clear idea of the insect as we understand it, a full description of a male and a female are here given, together with figures of the salient features, measurements and color features.

Elongata is compared with *P. schistopyga* on a subsequent page. The above key summarize the chief diagnostic features of the species.

DESCRIPTION OF MALE.—San Francisco Mountains, thirteen kilometers north of San Cristobal, Province of Santo Domingo, Dominican Republic, Hispaniola. September, 1905. (A. Busck.) [United States National Museum.]

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[1] See p. 11, footnote 1.
[2] See p. 26, footnote 2.

Size medium; form similar to that of *Ischnoptera rufa*, but more elongate and not as robust as is usual in *Symploce;* surface weakly polished, tegmina subcoriaceous.

Head narrowly visible cephalad of pronotum when viewed from dorsum; occipital line arcuato-truncate when viewed from the dorsum; least occipital interspace between eyes narrow, not more than two-thirds of occipital depth of eye, moderately concave on each side by the arcuation of the eye outline; interspace between the ocellar spots faintly greater than least width of interocular space; ocellar spots prominent, large, in outline subtrapeziform; outline of head pyriform; greatest width slightly less than greatest length, eyes not projecting, continuing regular outline; face faintly arcuate in profile. Palpi with third joint of medium build, slightly arcuate; fourth joint two-thirds as long as third joint, moderately infundibuliform, apex obliquely truncate; fifth joint about one and one-third times as long as the fourth joint, lanceolate, regularly narrowing in the distal two-thirds. Eyes very strongly reniform in basal outline, the width ventro-caudad about one-half that dorso-cephalad. Antennæ surpassing the apex of the abdomen; joints very numerous, those proximad, except for proximal two, very short.

Pronotum moderately transverse, the greatest length contained about one and one-quarter times in greatest width, in outline trapezate-ovate, with the greatest width slightly caudad of the middle: cephalic margin arcuate, roundly passing into the caudad diverging, oblique, arcuato-truncate lateral margins, which from the rounded point of greatest width are convergingly weak arcuate to the caudo-lateral angles, which are rounded obtuse; caudal margin faintly produced mesad, as a whole gently arcuate; all margins cingulate. Disk of pronotum with distinct, straight, cephalad diverging impressions on caudal half. In section the disk of the pronotum is deplanate caudad, moderately arcuate cephalad; lateral sections appreciably deflexed, the immediate vicinity of the lateral margins narrowly subreflexed.

Tegmina surpassing apex of abdomen by approximately the pronotal length, elongate, subequal lanceolate, greatest width of tegmina contained nearly three and one-half times in greatest length of same: costal margin moderately arcuate in region of marginal field, straight for greater portion of scapular field and rather sharply and abruptly rounded distad to the rounded, weakly obtuse-angulate apex, which is somewhat nearer costal than sutural margin; sutural margin straight, with a relatively short and oblique subtruncate arcuation to apex. Marginal field of medium width, relatively short; scapular field occupying less than two-fifths of total tegminal width; anal field elongate pyriform, its greatest width contained two and one-half times in greatest length of field. Costal veins of tegmina twenty-one in number, strongly oblique; discoidal vein bifurcate at three-fifths of length of tegmen from base, sutural fork simple, straight; discoidal sectors longitudinal, eight in number inclusive of ulnar vein and exclusive of sutural fork of discoidal vein; axillary veins seven in number; intercalated false veins prominent. Wings large, greatest width contained one and two-thirds times in greatest length of same; costal margin weakly arcuate in the region of the costal veins, the apex of the wing rounded, weakly obtuse-angulate; axillary region much shorter than anterior field; intercalated triangle evident but small, elongate, in length contained five and one-half times in length of wing along anal vein. Costal veins of wings twenty in number, including mediastine vein, the distal ones largely bifurcations of rami of the discoidal vein, oblique, non-clavate; discoidal vein bifurcate slightly distad of middle; medio-discoidal area subequal in width to medio-ulnar area, divided into relatively regular quadrate areolets; ulnar vein with three complete and three incomplete rami; axillary vein with three rami, all diverging proximad of middle and the first little removed from the basal arch.

Abdomen with dorsal surface concave, appreciably upcurved laterad; median segment simple: tergites one to seven with caudo-lateral angles rectangulate; distal margin of tergites one and two in general truncate, slightly sinuate near lateral angles; distal margin of tergites three to five faintly to appreciably arcuate-emarginate mesad; tergite six with margin subtruncate, briefly and shallowly emarginate mesad; surface of tergites two to six with a faint, incomplete median carina, laterad of the carina these segments have numerous short, irregular and often weak, carinulations or folds; seventh tergite hidden under the specialized sixth, moderately produced laterad into bluntly rectangulate lobulations; eighth tergite much narrower than sixth, the margin broadly and deeply obtuse arcuate-emarginate. Supra-anal plate transverse, distal margin bearing a pair of moderately converging digitiform processes, which in length are equal to that of plate itself, and are separated by a diastema subequal to distance from mesal side of base of process to lateral margin of plate; median diastema arcuato-truncate, an appreciable excision of plate; digitiform processes blunt at apex, ventral surfaces with heavy brushes of long adpressed, agglutinated hairs. Cerci elongate, subfusiform, tapering in distal two-thirds; dorsal surface deplanate, ventral surface with segments individually nodose. Subgenital plate asymmetrical, the margin, from sinistral to dextral side, showing first an oblique truncation to mesad of sinistral style, then a rectangulate projection carrying the dextral style to its apex, then a strongly oblique subtruncate arcuation dextrad: styles short; the left, simple, tapering and moderately decurved; the right, incrassate, hardly tapering, incurved and decurved, the apex with a group of spiniform teeth.

All femora appreciably compressed. Ventro-cephalic margin of cephalic femora with "Type B" spination, the proximal large spines six in number, the distal two decreasing in length, these large spines with a row of minute serrulations on their distal faces; distal series of minute spinulations with numerous and closely placed components; apical spines of ventro-cephalic margin three in number, the two distal ones much longer than the other; ventro-caudal margin of cephalic femora with four spaced spines. Median and caudal femora well spined beneath. Caudal tarsi slender, metatarsus slightly longer than remaining joints united; ventral surface of three proximal joints biseriate spinulose; pulvilli apical and subtrigonal.

Description of Female.—San Lorenzo, Province of Samaná, Dominican Republic, Hispaniola. June 27 to 29, 1915. (Watson; taken at light.) [American Museum of Natural History.]

Differing from the description of the male sex in the following features.

Interspace between eyes approximately subequal to occipital depth of eye; interspace between ocellar spots subequal to least width of interocular space.

Pronotum with diverging depressions of disk of pronotum less evident than in male.

Tegmina with greatest width contained three and one-fifth times in greatest length of same; costal veins twenty-three in number, formed as in male; discoidal vein furcate at middle.

Abdomen with dorsal surface unmodified and non-specialized. Supra-anal plate transverse, broadly arcuate produced mesad and there with a decided arcuate-angulate emargination. Subgenital plate large, deplanate, the distal margin truncato-arcuate between the cercal bases.

Cephalic femora with ventro-cephalic margin having as many as nine of the large proximal spines, these in decreasing length distad, but sharply cut off from the spinulations.

General color of dorsal surface raw sienna with a touch of orange-rufous, the dorsal surface of the abdomen washed with raw umber. Head with region dorsad of antennal bases and occiput claret brown to maroon; lower face and palpi raw sienna; eyes antique brown blotched with fuscous; antennæ of the dorsal color, washed with raw umber proximad, except on the two proximal segments. Pronotum with disk more opaque than remainder, but uniformly colored. Tegmina with marginal field more hyaline than remainder of tegmina. Wings hyaline, slightly washed distad and more solidly in the region of the costal veins with brussels brown; veins pencilled in raw umber. Abdomen with the disto-dorsal section and the cerci approaching deep bay. Coxæ and femora raw sienna; tibiæ bay or very deep bay, the spines burnt sienna; tarsi bay proximad, regularly paling to weak antique brown (♂) or auburn (♀) distad. Venter of abdomen antique brown or amber brown, slightly darkening laterad, and distad passing into deep bay.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, San Francisco Mountains, Dominican Republic	11.7	3.4	4.2	14.2	4.1 mm.
♂, Port-au-Prince, Haiti	14.6	4.1	4.9	16.5	4.6
♂, Port-au-Prince, Haiti	14.5	3.7	4.6	15.2	4.8
♀, San Lorenzo, Dominican Republic	11.5[1]	4.2	5.6	16	4.7
♀, Port-au-Prince, Haiti	15.5	4.9	5.1[2]	16.9	4.6

The measurements given above show the extent of individual variation in size found in the series. The interspace between the eyes is occasionally as narrow as one-half of the occipital depth of the eye in the male sex; the number of costal veins of the tegmina ranges from as great as twenty-one (♂) and twenty-three (♀), as given in the description, to as low as sixteen (♂) and eighteen (♀); the point of bifurcation of the discoidal vein of the tegmina varies so that it is occasionally in the middle of the length of the vein, while the number of discoidal tegminal sectors may be as great as nine. The costal veins of the wing may number as few as sixteen, while the incomplete rami of the ulnar vein of the wing may be as many as five. The ventro-cephalic margin of the cephalic femora has the proximal group of spines ranging in number from five to eight, in the case of one male showing these extremes on the pair; the number of spines on the ventro-caudal margin of the cephalic femora varies from three to four, the former number, however, present only on one limb in a single male. The median emargination of the distal margin of the sixth tergite is less pronounced in the other males than it is in the one described, while the second female has the median emargination of the supra-anal plate smaller than in the one described, being in fact a mere shallow obtuse-angulate emargination.

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[1] Abdomen somewhat twisted; length less than in life.

[2] The pronotum is less deplanate in this than in the other female measured, the condition in the batter, in our opinion, being hardly the normal transverse contour of the pronotum.

The species is evidently of wide distribution in the island, as the records here given show. Beauvois states it occurs in woods.

Pseudosymploce excisa (Bolivar)

Isch[*noptera*] *excisa* Bolivar, 1888, Mém. Soc. Zool. France, I, p. 124: ♂, ♀; Cuba.[1]

As we have stated above we feel confident the present species will be found to be a member of the genus *Pseudosymploce*. Its differences from *P. elongata*, as far as can be determined from the original description, are: the much greater size, the emargination of the supra-anal plate of male filled with whitish membrane, the excision of the lateral processes of same plate each with a single apical point, and the absence of black from the base of the discoidal vein of the tegmina.

The occurrence of this species in the mountainous region of eastern Cuba and of *P. elongata* in the mountains of Hispaniola is suggestive. The Jamaican species of the genus is also known to reach a considerable elevation in that island. The possibility of the three species being representatives of an ancient fauna, probably absent from much of the lower country, is worthy of consideration. We know nothing of the species aside from the information contained in the original description.

Pseudosymploce schistopyga,[2] new species

Plate VI, Figures 13 to 15

A close relative of the Hispaniolan *P. elongata*, but differing in its somewhat more slender, elongate form, proportionately broader and shorter head, with somewhat more evident eyes; in the distal margin of the supra-anal plate of the male having its median emargination much broader, distinctly wider than its depth laterad (including total length of lateral processes), in the lateral digitiform processes of the same plate being less robust and in contact with cercal alveoli (instead of an intervening section of the margin being present, as in *P. elongata*), in the somewhat greater production of the median section of the male subgenital plate, and the more elongate styles.

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[1] According to Gundlach this material came from Yateras, Oriente.

[2] From *σχιστός*, divided, and *πύγε*, rump, in allusion to the character of the male supra-anal plate.

Type.—Male; Port Antonio, Portland Parish, Jamaica. December 7. (A. E. Wight.) [Museum of Comparative Zoölogy.]

As this species closely resembles *P. elongata* in a large proportion of its features, the following description is largely comparative with the preceding one of *elongata*.

Description of Type.—Form somewhat more slender than in *P. elongata* and apparently more elongate.

Head with greatest width across eyes contained one and one-sixth times in greatest depth of head; occipital interspace between eyes relatively narrow, but slightly more than half of occipital depth of eye; interspace between ocellar spots equal to about one and one-half times the least width of interocular space; ocellar spots prominent, large, ovato-trigonal in outline. Palpi much as in *P. elongata*.

Pronotum proportionately elongate and narrower than in *elongata*, its general outline more circular, due to cephalic margin being broader and lateral margins somewhat less oblique and faintly more convex; caudo-lateral angles less evident and more rounded; median production of caudal margin faintly more produced.

Tegmina with apex slightly more rounded and less angulate; passage from sutural margin to apex more arcuate and less oblique subtruncate than in *P. elongata:* costal veins eighteen to twenty in number; discoidal vein bifurcate as in *P. elongata,* discoidal sectors as in same. Wings with costal veins totalling fifteen, including mediastine vein in this number, structure and character as in *P. elongata;* ulnar vein with three complete and four incomplete rami.

Abdomen of type damaged in proximal section, so the exact character of those segments cannot be determined; sixth tergite with no evident median emargination, there bearing only a narrow and low carinulate fold of the surface on its distal half; seventh and eighth tergite as in *elongata*. Supra-anal plate with median emargination proportionately far broader than in *elongata*, but little less than half as wide as entire plate at broadest point, and more than one and one-half times as broad as its lateral depth including total length of marginal digitiform process, margin at bottom of emargination biconcave; digitiform processes proportionately shorter, more slender and more decidedly twisted than in *P. elongata*, flattened on their oblique lateral surfaces, lateral bases of processes in contact with cercal alveoli. Subgenital plate slightly more produced rectangulate mesad; styles appreciably longer, dextral one decidedly so and more tapering distad. Ventro-cephalic margin of cephalic femora with large spines of proximal group numbering five to seven, in the latter the two distad very distinctly smaller than the others of this category, spination of remainder of margin as in *elongata;* ventro-caudal margin of cephalic femora with three to four spines.

Allotype.—Female; Pleasant Hill, Blue Mountains, Jamaica. Elevation, 3660 feet. July 23, 1923. (Rehn; attracted to light in house at night.) [Academy of Natural Sciences of Philadelphia.]

The following characters are solely those of noteworthy difference from the preceding description of the male sex.

Size appreciably larger. Head with occipital interspace between eyes slightly greater than occipital depth of eye; interspace between ocellar spots slightly less than least width of occipital interspace.

Supra-anal plate much as in *P. elongata*, but with median emargination of the margin much less evident and distinctly smaller.

Cephalic femora with large spines of proximal group of ventro-cephalic margin numbering from two to five.

General impression of color tone of dorsal surface is from sanford's brown (♀) to between sanford's brown and auburn (♂) (of Ridgway), the tegmina, however, when viewed by transmitted light are seen to be near buckthorn brown in color. Head chestnut, with lower margin of face, clypeus, lower border of genæ, and mandibles occasionally (♂) pale zinc orange; eyes chestnut brown to raw umber clouded with fuscous; ocellar spots dull orange-chrome; palpi with ultimate and penultimate joint weakly (♀) or distinctly (♂) washed with bay; antennæ auburn, paling slightly distad, two proximal joints weakly chestnut. Pronotum slightly paler cephalo-laterad, there approaching orange-rufous. Tegmina with proximal portion of humeral trunk and anal sulcus weakly pencilled with auburn. Wings with veins and wash in region of costal group auburn. Dorsum of abdomen argus brown (♂) to sudan brown (♀), darkening distad; venter of abdomen ochraceous-tawny mesoproximad, becoming argus brown distad and laterad, passing to raw umber on the subgenital plate, cerci and styles. Coxæ and femora buckthorn brown (♀) to dresden brown (♂); tibiæ chestnut to bay, tibial spines burnt sienna; tarsi proximad of the same color as the tibiæ, paling distad to ochraceous-tawny.

Male.—Length of body, 15.5[1] mm.; length of pronotum, 3.4; greatest width of pronotum, 4.1; length of tegmen, 15; greatest width of tegmen, 4.

Female.—Length of body, 15.5 mm.; length of pronotum, 3.9; greatest width of pronotum, 4.6; length of tegmen, 17.5; greatest width of tegmen, 5.1.

The type and allotype are the only specimens of this species we have seen. The species apparently has a considerable vertical range in Jamaica, occurring from near sea-level to over thirty-six hundred feet elevation.

ISCHNOPTERA Burmeister

At one time considered to be a genus of virtually world-wide distribution within the tropics and subtropics, the genus *Ischnoptera* is now known to be of much more restricted distribution, probably being largely peculiar to tropical and subtropical America, with a very few species entering the temperate portions of both North and South America. The bulk of the Old World species previously assigned to *Ischnoptera* have not been examined in the light of present day knowledge of the genus, chiefly secured from its genotype (*I. morio* Burmeister), but such examinations as have been made show genera other than true *Ischnoptera* to be represented. The clarification of this situation as far as carried out to date, has been presented in several papers of the present authors.[2]

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[1] This length is practically an estimate, as the abdomen had been detached from the type and several proximal segments had been destroyed or badly damaged. In consequence this figure represents a total of the two pieces and an allowance for lost segments. It may be entirely too great and is certainly not too small.

[2] M. Hebard: 'Studies in the Group Ischnopterites' (1916, Trans. Amer. Entom. Soc. XLII, pp. 337–383); 'The Blattidæ of North America, North of the Mexican Boundary' (1917, Mem. Amer. Entom. Soc., No. 2, pp. 60–62, 70–74, 149–151). J. A. G. Rehn: 'Contributions to our Knowledge of the Dermaptera and Orthoptera of the Transvaal and Natal' (1922, Annals of the Transvaal Museum, IX, part 1, pp.23–25).

While numerous species of *Ischnoptera* occur in South America and Central America, but four representatives of the assemblage have been seen from the West Indies, one a geographic race of a species the range of which nearly encircles the Gulf of Mexico and the Caribbean Sea, a second more nearly related to Andean forms and probably limited in distribution to the Blue Mountains of Jamaica, and a third and fourth belonging to the very diverse tropical American *Rubiginosa* Group of the genus, one of these being Cuban (and probably as an adventive Hispaniolan), the other known only from the Blue Mountains of Jamaica. Very probably the first mentioned form, *I. rufa rufa*, is a relatively recent arrival, a vigorous stock of marked adaptability which has penetrated most of the low-lying country within its general range: the other three species seem to be representatives of a more ancient fauna, of which the Jamaican forms are known only from the higher mountains, while the Cuban one is more generally distributed. This latter fact has an added significance when it is noted that *I. rufa rufa* is not known from Cuba.

KEY TO WEST INDIAN SPECIES OF *Ischnoptera*[1]

1. Form relatively robust; pronotum proportionately of large size. Supra-anal plate of male not markedly produced mesad and distal margin undivided. Styles of male subgenital plate markedly unsymmetrical in position and unequal in development. (Size medium.) (Probably entire West Indies except Cuba.) .... *rufa rufa* (DeGeer).

Form more elongate; pronotum proportionately of smaller size (particularly in *I. podoces*). Supra-anal plate of male with distal margin divided and sometimes markedly produced mesad (*ligula*). Styles of male subgenital plate not markedly unsymmetrical in position and subequal in development except in *I. ligula*. (Size medium to small.). .... 2.

2. Size medium. Pronotum proportionately larger. Tegmina more ample in proportion to general bulk. (General facies considerably resembling *Pseudosymploce*.) (Jamaica.) .... *podoces*, new species.

Size small. Pronotum proportionately larger. Tegmina less ample in proportion to general bulk .... 3.

3. General coloration dark; head, disk of pronotum, much of tegmina and dorsum of abdomen dark brownish. Supra-anal plate of male not markedly produced. Styles of male subgenital plate similar in development. (Jamaica.) *oreochares*, new species.

General coloration ochraceous, with little or no dark brownish. Supra-anal plate of male markedly produced mesad. Styles of male subgenital plate dissimilar in development. (Cuba and Hispaniola.) . . . *ligula*, new species.

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[1] Two species of the genus have been described from the West Indies, which are not here treated under *Ischnoptera*. These are *I. excisa* Bolivar (1888, Mém. Soc. Zool. France, I, p. 124), and *I. adusta* Caudell (1905, Canad. Entom., XXXVII, p. 237). The former we have reason to believe is a member of the new genus *Pseudosymploce*, under which it is discussed, while the latter is a *Neoblattella*, and as such is treated in this paper. *Ischnoptera parvula* of authors, as recorded from Cuba, is not the South American insect originally described under that name by Saussure, but is the species here described as *I. ligula*.

Ischnoptera rufa rufa (DeGeer)[1]

Blatta rufa DeGeer, 1773, 'Mém. Hist. Ins.,' III, p. 539, Pl. xliv, fig. 7. Surinam.

Jamaica.—Montego Bay, St. James Parish. Palm Beach, Montego Bay. Mandeville, Manchester Parish, elevation 2131 feet, XI, 24–26, (F. E. Watson; in hotel), 1♂, 1 immat. ♂. Liguanea Plain, near Kingston, VII, 5, 1920, (R. and H.; under limbs and leaf litter in mangrove swamp), 1♂, 1♀, 1 immat. ♀, [Hebard Cln. and A. N. S. P.].

Hispaniola.—Sanchez, Province of Samaná, Dominican Republic. Moca, Prov. Pacificador, Dominican Republic, I, 1922, (E. Kaempfer), 1♀, [A. N. S. P.].

Porto Rico.—Arecibo, Department of Arecibo. Ensenada, Guanica Harbor, Department of Aguadilla.

St. Croix.—Eveques Valley.

Dominica.—Roseau. No exact locality.

Barbados.—No exact locality.

We have given simply the locality information for the records from the West Indies, tabulated by Hebard in his analysis of the forms of this species,[1] adding solely the new material examined. Typical *rufa* is now known to occur probably throughout the West Indies exclusive of the Bahamas and Cuba, on which islands it has never been encountered. Brunner has recorded what is probably this subspecies from Grenada as *I. occidentalis*, which name belongs to a race of the present species found on the mainland of Central America and Mexico.

Outside of the West Indies the typical form of the species apparently occurs across northern South America, being known from British and Dutch Guiana, and in Central America from Panama. For detailed information regarding this species and its geographic forms see two recent studies by the junior author.[2]

The male from the Liguanea Plain is of particular interest as it has the interocular space as broad at the occiput as in the average female, the area being somewhat greater than the occipital depth of the eye. The interocellar space is also quite broad, being but very faintly narrower than the interocular space. The genital features of the individual are typical of the subspecies.

The dates of occurrence for the West Indian material of this form cover from early March to early November, and it would seem to be found adult throughout the year. The species is an adaptable one, being found in a variety of situations, although none of the material of the present race was taken in forest conditions. While hardly a domiciliary form it would seem to frequent environments where man has considerably disturbed natural conditions, as under débris, docks, under logs and stones in cultivated areas. It also has been taken hiding under litter on limestone areas and attracted to lights.

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[1] See Hebard, 1916, Trans. Amer. Entom. Soc., XLII, pp. 346–354.

[2] *Loc. cit.*: 1920, Mem. Amer. Entom. Soc., No. 4, pp. 70–72.

The fact that this species would seem to be regularly distributed from Hispaniola and Jamaica around the curve of the Antilles to the coast of South America, but at the same time absent from Cuba, is of considerable significance in the study of the history of the West Indian blattid fauna.

Ischnoptera oreochares,[1] new species

Plate VIII, Figures 6 to 11

This dark colored species, of small size, belongs to the *Rubiginosa* Group, which is greatly and diversely developed in continental tropical America. The present species and the quite different Cuban *I. ligula,* here described, are the only West Indian forms we are placing in the group, which, however, may need further subdivision and regrouping when we are better acquainted with a number of species in hand but at present undescribed. The Cuban *ligula* stands apart from the dark colored species in a number of features, discussed elsewhere, but *oreochares* has more the general fascies of the continental species, although the genitalic features are quite distinctive.

We have compared this new species with a number of members of the *Rubiginosa* Group, particularly with those to which it shows affinity in certain features, i. e., *I. panamæ* Hebard and *nana* Saussure and Zehntner of Central America and *rubiginosa* Walker of the Guianas and northern Brazil. The virtually symmetrical male subgenital plate and subequal styles of *oreochares* are very different from the markedly asymmetrical and contorted male subgenital plate of *rubiginosa,* which latter species, however, has a more general resemblance to *oreochares* in coloration and wing form. The new species is larger than any of the species with which we are comparing it. Saussure and Zehntner's *nana* has much shorter body and tegmina, with rather long incrassate costal-veins of the wings, and the supra-anal plate of the male is less produced and apparently with a different structure of its apex. The feature which does most definitely suggest relationship with *nana* is that the styles of the male subgenital plate of the latter are said to be normal, which would be in practical accordance with the condition found in *oreochares.*

Type.—Male; Pleasant Hill, Blue Mountains, Jamaica. Elevation, 3660 feet. July 29, 1923. (Rehn; attracted to light in garden.) [Academy of Natural Sciences of Philadelphia, Type No. 5420.]

Description of Type.—Size relatively small (length of body, 11.9 mm.); form moderately slender and elongate; surface of body but moderately polished.

Head with occipital interspace between eyes very broad, about equal to occipital depth of eye; interspace between ocellar spots very faintly greater than that between eyes, shape of spots ovoid, these set obliquely, size medium. Palpi with penultimate joint short, not more than two-thirds as long as antepenultimate joint, infundibuliform; ultimate joint nearly twice as long as the penultimate joint, large, virtually lanceolate in lateral outline, as seen in extensor aspect hardly compressed.

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[1] From *ὀρειο-χᾰρής*, delighting in the hills.

Pronotum subtrapezoid in outline, not markedly transverse, greatest length contained one and one-fourth times in greatest width, which is at three-fifths the length from cephalic margin; cephalic margin moderately convex, broadly passing laterad into the moderately diverging, slightly arcuate lateral margins; lateral angles very broadly rounded and passing caudad to the obtusely rounded caudo-lateral angles; caudal margin equal to approximately three-fourths the width of pronotum at broadest point, arcuato-truncate; surface of dorsum of pronotum with moderately indicated and relatively broad diverging impressions, which are placed slightly caudad of the middle; lateral portions of pronotum appreciably deflexed, rather narrow, very broadly rounding to dorsal surface, which in transverse section is gently arcuate cephalad of the impressions, more deplanate caudad.

Tegmina elongate, surpassing apex of abdomen by slightly more than one and one-half times pronotal length, lanceolate, narrow, greatest width contained about three and three-fourths times in greatest length of same, venation relatively conspicuous, moderately elevated: costal margin moderately oblique truncato-arcuate in proximal fourth, thence straight but briefly rounding to the non-angulate apex; sutural margin more broadly rounding to apex than costal margin: marginal field relatively small, narrow, short, not reaching as far distad as apex of anal field; scapular field very largely of uniform width; anal field elongate subpyriform, reaching nearly to two-fifths of length of tegmen: costal veins twenty-three in number, certain of the distal ones made by bifurcation; discoidal sectors nine to ten in number; anal vein slightly sigmoid in distal half; axillary veins six in number. Wings with greatest width contained about one and one-half times in greatest length of same; anterior field appreciably produced distad of radiate field, apex marked but well rounded: costal veins simple, oblique, non-clavate, twenty in number and more spaced distad than elsewhere; ulnar vein with three complete and three incomplete rami; medio-discoidal field at widest point nearly half again as wide as medio-ulnar field, former with numerous transverse nervures forming generally subquadrate areolets, latter field with a fewer number of incomplete transverse nervures from costal side of ulnar vein; intercalated field relatively small and narrow.

Dorsum of fifth abdominal tergite with distal margin obtuse-angulate emarginate mesad, rounding off lateral into the more truncate lateral sections of margin, surface of plate proximad of emargination longitudinally bi-impressed on each side of a low and weak median fold: sixth evident tergite with caudo-lateral angles moderately acute produced; distal margin of segment very broadly obtuse-angulate emarginate, immediate angle of emargination slightly rounded excavate: seventh evident tergite narrowly visible, not projecting laterad, bearing mesad a broad, low, elevated fold, which is flanked laterad by the usual comb-like appendages extending from between this and preceding segment: eighth evident tergite with distal margin broadly and completely concave, lateral angles acute. Supra-anal plate slightly distorted in type in drying, but natural form quite evident, distal section moderately produced, narrowing distad, linguiform, lateral margins of production biconvex to distal margin, which is broadly rounded with a slight and shallow median emargination, distal section of production with numerous radiating chætæ. Subgenital plate but slightly asymmetrical, greatest (proximal) width about one and one-third times the greatest median length; sinistral margin to base of sinistral style shallowly concave, the margin regularly thickening distad to stylar base; dextral margin as seen from venter nearly straight for more than proximal half, thence obliquely truncate to base of dextral style; interstylar portion of margin concave, this and adjacent lateral sections well supplied with short, erect chætæ, internal surface of same region thickly clothed with adpressed spinulæ: styles simple, small, short, thick, subequal, placed in relatively the same positions on plate, distal extremity with a few massed short spinulæ: ventral surface of subgenital plate transversely deeply impressed in distal third. Cerci relatively robust, subequal in width in proximal two-thirds, tapering bluntly distad, dorsal surface depressed and deplanate. Anal orifice as seen in caudal aspect shows chiefly: extending ventrad from dextro-proximal section of ventral margin of subgenital plate a large inflated reniform appendage; extending caudad from sinistral side a large inflated, moderately acute production, with many adpressed hairs and several groups of agglutinated spiniform chætæ at apex.

Cephalic femora with proximal group of large spines on ventro-cephalic margin two to three in number, in the latter case the distal one is smaller than the other; spinulations between the proximal and distal groups of large spines on same margin numerous, becoming exceedingly short distad; ventro-caudal margin of cephalic femora with a single median spine in addition to the usual distal one. Caudal metatarsus slightly longer than remainder of tarsus.

Allotype.—Female; Cinchona, Blue Mountains, Jamaica. Elevation, 4900 feet. July 29, 1923. (C. C. Gowdey.) [Academy of Natural Sciences of Philadelphia.]

Description of Allotype.—Differing from the above description of the type in the following noteworthy features.

Size, form, and surface as in male.

Head with occipital interspace between eyes slightly broader, equal to one and one-fifth times the occipital depth of eye; interspace between ocellar spots slightly less than that between eyes at occiput.

Pronotum in general form slightly more transverse, greatest length contained one and one-third in greatest width; caudal margin faintly more angulate mesad than in male. Disk impressions much less marked than in male, hardly evident.

Dorsum of abdomen with tergites unmodified, as usual in female sex. Supra-anal plate arcuate trigonal, greatest proximal width slightly less than twice median length, margin arcuate with faint median truncation distad; surface with a transverse concave arcuation connecting the regions at the cercal bases. Subgenital plate large and broad, moderately transverse, margin very broadly and regularly arcuate.

Cephalic femora with ventro-cephalic margin having as many as four (three on one limb) spines in proximal group.

General color of dorsal surface kaiser brown (male) to prout's brown (female), lateral sections of pronotum and narrowly the cephalic margin dull ochraceous-orange, an intimation of the same pale color found in the marginal field and along the costal margin of at least a portion of the scapular field in the female. Head blackish chestnut brown, in the male passing to ferruginous in the buccal region. Palpi of male pale zinc orange, of female largely of the color of the head touched with ochraceous. Eyes blackish (male) to mummy brown (female). Antennæ ochraceous-tawny, washed with zinc orange (male) to prout's brown (female). Pronotal disk somewhat clouded with fuscous, this on cephalic section in male, more general and deeper but cloudy and irregular in the female, in both sexes appreciably divided in two by an indefinite medio-longitudinal pale bar. Wings infumate with pale bister, veins pencilled with prout's brown, a cloud of latter in costal region. Dorsum of abdomen distad and laterad mummy brown, paling meso-proximad to dresden brown (female) or buckthorn brown (male). Male supra-anal plate narrowly bordered with russet; female supra-anal plate tawny olive. Cerci kaiser brown (male) to mummy brown (female), slightly paler distad. Female with venter of abdomen and coxæ mummy brown; remainder of limbs ochraceous-tawny, the tibiæ and their spines washed with mummy brown. Male with venter of abdomen ferruginous, broadly bordered laterad and distad with mummy brown, distal section of subgenital plate dully ferruginous; limbs of male ochraceous-tawny, tibial spines washed with russet.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Pleasant Hill, type..	11.9	2.7	3.4	12.7	3.4mm.
♀, Cinchona, allotype..	10[1]	2.5	3.3	12.2	3.2

The type and allotype are the only specimens of this most interesting species which we have seen. Apparently there is a considerable range of color tone, from the evidence of the type and allotype.

Ischnoptera ligula,[2] new species

Plate IX, Figures 5 to 7

This species is the one erroneously identified as *I. parvula* by Saussure, Bolivar, Gundlach and Rehn. The latter species is, as far as known, South American, being described from Brazil, and it is quite distinct, as material now in hand shows. The present species is, as far as present knowledge goes, restricted to Cuba and Hispaniola.

The species belongs to the very diverse *Rubiginosa* Group of the genus, all the forms of which are of small size, often similar in general appearance and in coloration, but with very striking and distinctive genital characters. The greatly produced, tongue-like structure of the supra-anal plate of the male in this species is very different from that found in any of the known forms, while the character of the subgenital plate is more suggestive of that of *I. amazonica* Rehn,[3] from the Amazonian region, than that of any other form, but the resemblance is not indicative of close relationship. The smaller size, more robust cephalic limbs and greater interspace between the eyes, as well as the absence of an accessory arm on the ventral surface of the male supra-anal plate, will aid in the recognition of the species. The species is in no way closely related to the Jamaican *I. oreochares*, described above.

TYPE.—Male; Havana, Cuba. (C. F. Baker.) [Academy of Natural Sciences of Philadelphia, Type No. 5357.]

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[1] The rear of the body is bent ventrad and this measurement is actually short of the true length, which could only be estimated.

[2] A little tongue, in allusion to the form of the male supra-anal plate.

[3] 1916, Trans. Amer. Ent. Soc., XLII, p. 225, Pl. XIV, figs. 4, 5, 6, 7 and 8.

Size very small; form moderately depressed, elongate elliptical; surface moderately polished.

Head visible cephalad of pronotum, when viewed from dorsal aspect, for almost its entire width: occipital line gently arcuate; interspace between eyes broad, slightly but appreciably greater than the dorso-ventral depth of eye; form of head broad pyriform, the width across eyes slightly less than greatest depth of head, outline of eyes very broadly rounded; face but moderately inflated; ocellar spots large, in outline elongate trapezoidal: palpi robust, as a whole subcompressed; third joint short; fourth joint about two-thirds as long as fourth joint, rather strongly infundibuliform; fifth joint large, nearly twice as long as the fourth joint, in profile acute lanceolate, its proximal depth contained about three times in length, strongly compressed; eyes not at all prominent, in basal outline strongly reniform, narrowing toward the buccal region; antennæ with proximal joint moderately robust.

Pronotum slightly transverse, greatest length contained one and one-fifth times in greatest width, in outline roughly rounded trapezoidal, greatest width placed distinctly but not markedly caudad of the middle of the disk: cephalic margin arcuate, regularly rounding into the oblique subarcuate, cephalad converging cephalic portion of lateral margins: lateral angles broadly rounded, caudal section of lateral margins obliquely subtruncate, the caudo-lateral angles rounded obtuse; caudal margin weakly but distinctly arcuate; all margins finely cingulate: surface of disk with the usual paired ischnopterine oblique depressions weakly indicated and placed at the transverse middle; in transverse section the pronotum is strongly arcuate, the lateral sections appreciably deflexed.

Tegmina elongate, surpassing the apex of the abdomen by almost the pronotal length, the margins subparallel, the greatest width contained three and three-fifth times in the greatest length of same: costal margin moderately arcuate proximad and briefly distad strongly arcuate to the well rounded apex, greater portion of costal margin almost straight; sutural margin straight, distad rounding more broadly to the apex than is the case with the costal margin: marginal field short and relatively broad; anal field very elongate, broad subpyriform, the anal sulcus reaching the sutural margin slightly distad of proximal third: costal veins twenty in number, simple, oblique; discoidal vein straight in greater portion of length, very moderately arcuate proximad; discoidal sectors as a whole longitudinal, those in the vicinity of the anal sulcus somewhat oblique and reaching the sutural margin well before the apex, eight to nine in number, transverse nervures numerous and forming generally quadrate areolets; axillary veins six in number; intercalated veins prominent throughout tegmina. Wings with the costal margin in the region of the costal veins arcuato-truncate, rounding to the broadly subangulate apex; intercalated triangle relatively small, elongate: costal veins numerous (seventeen plus), a number derived from the mediastine vein, oblique, median group faintly elongate clavate, distal ones rarely furcations of a common discoidal ramus: medio-discoidal area appreciably broader than the medio-ulnar area, narrowed distad by the bending back of the discoidal vein, divided into quadrate areolets by relatively regular cross veinlets; medio-ulnar area with fewer cross veinlets, which form oblong rectangulate areolets; ulnar vein with two complete and three to four incomplete rami; axillary vein with two rami on peripheral side.

Abdomen markedly depressed, lateral portions reflexed dorsad; dorsal surface of abdomen with antepenultimate tergite (not counting supra-anal plate) markedly and relatively broad V-arcuate emarginate, exposing a median, well elevated and slightly compressed, rounded fold of the penultimate tergite, the distal margin of which fold is broadly V-emarginate, bordering this fold laterad lay a pair of slender, slightly arcuate digitiform processes, shorter than fold and with acute apices; tergite proximad of supra-anal plate, narrow, margin broadly arcuate emarginate: supra-anal plate transverse proximad and with a produced linguiform process, the dorsal surface of which and the adjacent portion of the transverse proximal section is roundly inflated, the disto-lateral angles of the process rectangulate, curving ventrad under the distal section of the process, which is much arcuate or curled in transverse section, distal margin of process sharply truncate: cerci subfusiform, tapering distad, apex moderately acute, depressed dorsad, arcuate ventrad, composed of eleven joints: subgenital plate relatively large, asymmetrical, dextral margin regularly arcuate to near the median line, the general vicinity of the margin largely reflexed dorsad, mesad the margin is slightly angulate and bears a short, falcate style with acute apex, thence the margin sinistrad is straight oblique for about one-half the length of that portion of the margin, thence broadening sigmoid, the sinistral style about as long as dextral one, straight, the apex with a dorsal spine: genital hook heavy, moderately arcuate at apex but recurved or strongly falcate.

Limbs relatively robust: cephalic femora with "Type B" spination on ventro-cephalic margin, the large proximal spines three in number, the apical spines three in number, the two distal very long; ventro-caudal margin with a single spine, which is mesad: median and caudal femora with both margins regularly but not closely nor heavily spined; caudal tarsi slender, with metatarsus slightly longer than remaining joints combined, ventral surface biseriately spinulose, a small apical pulvillus present; second and third joints biseriately spinulose ventrad, metatarsus, second and third joints with apical pulvilli: arolia present on all tarsi.

Allotype.—Female; Cayamas, Oriente Province, Cuba. May 9. (E. A. Schwarz.) [United States National Museum.]

Differing from the description of male sex in the following features.

Size slightly larger; form somewhat more robust.

Tegmina with greatest width contained three and two-fifth times in greatest length of same; marginal field narrower than in male; costal-veins nineteen in number; discoidal sectors seven to eight in number.

Abdomen with dorsal surface hardly modified; antepenultimate tergite with three low, spaced, longitudinal folds on distal half of median third of segment; penultimate tergite narrowly, yet shallowly and broadly, emarginate mesad; tergite proximad of supra-anal plate with a slight trace of a median fold: supra-anal plate transverse, broadly and regularly triangular produced mesad, the apex of the triangle rotundato-truncate, cercal emarginations distinct; subgenital plate moderately large, moderately transverse, appreciably vaulted, margin arcuate with an almost imperceptible flattening mesad.

General color of dorsal surface ranging from pale orange-rufous to bay. Head ranging from burnt sienna to bay; eyes mars brown to fuscous; proximal antennal joint, ocellar spot and palpi pale cinnamon-buff; remaining antennal joints saccardo's umber to bister. Pronotum with disk of the general dorsal color; lateral, cephalic and caudal borders light ochraceous-buff to ochraceous-buff, cephalad this showing a tendency to form a median bar and divide the disk into lateral areas, occasionally, in very intensively colored specimens, the caudal margin is solidly colored with the disk, and in all the pale lateral borders extend deeply into the disk color along the oblique sulci. Tegmina of the general color, translucent, the right tegmina hyaline where normally covered when wings are closed; marginal field with weak whitish translucence. Wings with weak buffy wash, the principal veins pencilled to a greater or lesser degree with prout's brown; area of the costal veins and apical section of anterior field washed with translucent antimony yellow. Abdomen with dorsal surface of the general dorsal color, infuscate, to a greater or lesser extent, in intensive specimens with mummy brown, more pronounced distad and involving the supra-anal plate and cerci. Ventral surface of thorax and limbs pale cinnamon-buff to clay color; ventral surface of abdomen clay color to mars brown, in the latter extreme paling proximad.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Havana, Cuba, type.	8	2.3	2.8	8.7	2.4 mm.
♂, Cayamas, Cuba, paratypes (4).....	8.4 (8–8.9)	2.1 (2–2.2)	2.7 (2.5–2.9)	8.9 (8.5–9.2)	2.6 (2.5–2.9)
♀, Cayamas, Cuba, allotype............	9.6	2.5	3.1	9.2	2.7
♀, Cayamas, Cuba, paratypes (2).......	8.7 (8.3–9.2)	2.4 (2.4–2.5)	3 (3–3.1)	9.1	2.9 (2.8–3)
♀, Port-au-Prince, Haiti.................	9.5	2.5	3.2	10.2	3.1

In addition to the type and allotype we have before us four males from Cayamas, Oriente Province, Cuba, taken May 9, 17 and 21 and June 1, by E. A. Schwarz, and in the collection of the United States National Museum; two females secured at the same locality and in the same lot, secured May 7 and June 5; and one male from Guantanamo, Oriente Province, Cuba, taken May 22, 1914 by C. T. Ramsden, and in the collection of the Academy of Natural Sciences of Philadelphia. All of these may be considered paratypes. We have also examined two females from Port-au-Prince, Hayti (G. Lion; 1911), belonging to the Paris Museum, which are referable to this species. Quite possibly these may represent an accidental introduction from Cuba.

The species shows much variation in depth of coloration, having intensive and recessive extremes. The large spines proximad in the series on the ventro-cephalic margin of the cephalic femora vary in number from two to four, occasionally showing a variation of one spine in the same individual.

The Port-au-Prince material is somewhat larger than Cuban individuals, but otherwise is not separable from females from the larger island.

This species has been recorded, as *parvula*, definitely from Bemba, Cuba by Gundlach, and from Havana by Rehn. Nothing has been recorded relative to the habits of the insect.

Ischnoptera podoces,[1] new species

Plate VIII, Figures 1 to 5

This interesting species we are tentatively assigning to the *Apolinari* Group of the genus, an assemblage otherwise made up of *I. apolinari* Hebard, *pallipes* (Scudder), *pampaconas* Caudell and *colombiæ* Hebard, all from the Andean region of northern South America. The proportionately small pronotum, slender abdomen and elongate alar appendages point to the group assignment here given, although the nearly symmetrical subgenital plate and styles of the male are features of dissimilarity. These latter features, as well as the emarginate apex of the supra-anal plate of the male, are diagnostic.

TYPE.—Male; Morces Gap, Blue Mountains, Jamaica,[2] Elevation, 4980 feet. July 28, 1923. (Rehn; in dead leaf litter along trail in forest.) [Academy of Natural Sciences of Philadelphia, Type No. 5419.]

DESCRIPTION OF TYPE.—Size medium, tegmina and wings proportionately large; form slender when alar organs are closed; surface moderately polished.

Head pyriform when seen in cephalic aspect, greatest width across eyes contained one and one-fifth times in greatest depth of head: occipital interspace between eyes relatively broad, slightly wider than occipital depth of eye; interspace between ocellar spots subequal to that between eyes; ocellar spots relatively small, subtrigonal in general outline. Palpi with ultimate joint one and one-fourth times as long as penultimate joint, latter slightly shorter than antepenultimate joint.

Pronotum transverse subtrapezoid in outline, greatest length of pronotum contained one and one-third times in greatest width, which is at two-fifths the length from caudal margin; cephalic margin moderately arcuate, equal to nearly one-half of pronotal width, rounding into the diverging lateral margins, which caudad round over point of greatest width to the evident but broadly arcuate caudo-lateral angles, caudal margin broadly low arcuate with the faintest intimation of median angulation. Surface of pronotum markedly bi-impressed, these diverging.

Tegmina when closed surpassing apex of abdomen by about twice the pronotal length, lanceolate, somewhat broad in proportion, greatest width at distal third and contained slightly less than three and one-half times in tegminal length; apex more costal than sutural in position, rounded; sutural margin distad obliquely arcuate toward apex: costal veins more than twenty in number, distal ones largely bifurcate; discoidal rami nine; axillary veins six to seven in number; anal sulcus reaching sutural margin at one-third of its length from base. Wing with intercalated triangle relatively narrow but evident; costal veins, including mediastine vein, twenty-three in number, distal ones largely formed by branching, non-clavate; medio-ulnar area at its widest point three times as wide as medio-ulnar area at same point, divided into numerous, regular, rectangulate areolets; ulnar vein with three complete and five incomplete rami.

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[1] From ποδώκης, swift-footed.

[2] The exact environment in which the type was taken is well illustrated by Shreve in plate 6 of his work on the physiological plant geography of the Blue Mountains (Publ. No. 199, Carnegie Institution of Washington, 1914).

Abdomen with surface of proximal five tergites concave, lateral margins of that section well elevated, subparallel. Fifth tergite with distal margin truncate laterad, arching to a median, broad V-emargination, proximad of which the surface of the segment bears a median longitudinal tectate fold, the emargination exposing a thickened, elevated, transverse fold proximad on the sixth tergite; latter with distal margin broadly obtuse-angulate emarginate, with the immediate angle of the emargination roundly excavate above the pair of projecting comb-like appendages, which are so characteristic of *Ischnoptera;* caudo-laterad angles of tergite faintly acute but well rounded at apex; seventh tergite laterad largely hidden under preceding segment, distal margin very weakly angulate-emarginate, the surface mesad with a medio-longitudinal rounded fold, laterad of which lie the comb-like appendages attached to preceding tergite, caudo-lateral angle rounded produced with a spiraculiform opening; eighth apparent tergite with distal margin concave, slightly widened near lateral margin. Supra-anal plate somewhat asymmetrical, in general subtrapezoidal, its greatest length contained nearly twice in greatest proximal width, greatest width at distal extremity equal to half of greatest proximal width; lateral margins converging distad, dextral margin moderately concave, sinistral margin appreciably sigmoid; distal margin obtuse-angulate emarginate; dextro-caudal angle produced into a short, blunt, acute, though non-spiniform, angle, while proximad of this on the ventral surface of plate is a broad strumose thickening equal to one-half area of plate; sinistro-caudal angle as seen from dorsum less produced and more rounded than dextro-caudal angle, actual angle acute, subspiniform and bent ventro-mesad, being non-evident from dorsum, proximad of this angle ventral surface of plate bears a similar but much less extensive and less elevated strumose thickening. Subgenital plate nearly symmetrical, as seen from venter with lateral margins subparallel; distal margin obliquely subtruncate laterad, interstylar section of margin concave with an obtuse-angulate tendency; distal portion of plate impressed; styles almost equal and symmetrical in development, symmetrical in insertion, in size sinistral slightly the larger, relatively robust, tapering distad, in profile slightly decurved with dorsal surface convex and thickly covered with adpressed spiniform teeth. Cerci elongate fusiform, depressed dorsad.

Cephalic femora with ventro-cephalic margin having three to four spines in proximal group, distal group numbering three; ventro-caudal margin with three to four spaced spines. Caudal metatarsus slightly longer than remaining joints of that tarsus combined.

General color of exposed dorsal surface burnt sienna, paling distad on sutural section of tegmina and in apical region of same to ochraceous-buff with veins pencilled with burnt sienna. Head very dark chestnut-brown, clypeus and proximal palpal joints cinnamon-buff, ultimate and penultimate joint of palpi washed with prout's brown; eyes cinnamon-brown; antennæ washed with prout's brown, paler distad on two proximal joints. Pronotum with indefinite clouds of mummy brown broadly along caudal margin, less definitely on diverging impressed sulci and in vicinity of cephalic margin. Mesonotum, metanotum and dorsal base of abdomen buckthorn brown, passing on abdomen distad though dresden brown to light mummy brown, supra-anal plate with touches of ferruginous. Cerci mummy brown proximad, passing to brussels brown distad. Limbs, coxæ and pleura pale ochraceous-tawny, the pleura and basal portion of coxæ washed with prout's brown, which also weakly lines the extensor surface of the femora, distad the tarsi become washed with tawny. Venter of abdomen chestnut-brown, distal margin of subgenital plate edged with dull zinc orange.

Length of body, 13.5 mm.; length of pronotum, 3.1; greatest width of pronotum, 4.1; length of tegmen, 16.5; greatest width of tegmina, 4.8.

The type of this most interesting species is unique. Its sharply defined characteristics remove it from relationship with any species previously known from the West Indies, and its affinity, whether within the group or as the sole representative of another at present unrecognized assemblage, is clearly nearer the species now placed in the *Apolinari* Group. Those species are known only from the Peruvian and Colombian Andes. Whether all these forms are representatives of a very ancient fauna of wide distribution remains to be determined.

The only known specimen of this species was taken in company with the type series of *Cariblatta nebulicola*, in dead leaf litter along the trail side in the mountain forest at Morces Gap. It is probably a species peculiar to the higher forest region.

NELIPOPHYGUS,[1] new genus

This is a pseudomopid showing strong blattinid tendencies, particularly in the strongly developed chitinization, the specialization of the metanotum and the vaulted type of pronotum. Our chief reasons for placing it in the Pseudomopinæ are the character of the spine development and the structure of the genitalia. Particularly noticeable features of the genus are the relatively very great length of the tarsi compared with the tibiæ, and the absence of arolia between the tarsal claws.

Compared with the genera of the Pseudomopinæ lacking arolia, and to which *Nelipophygus* may bear relationship, we find the present genus obviously differs from *Paratemnopteryx* Saussure in the male sex having abbreviate tegmina and rudimentary wings, in the specialized metanotum, and in having an asymmetrical subgenital plate and distinct styles; from *Paraloboptera* in having attingent, not lateral, tegmina in both sexes, in the presence of rudimentary wings, in the specialized metanotum, in the lack of great specialization of the distal abdominal tergite and the character of the cephalic femoral armament.

We consider the genus an aberrant member of the Group Ischnopteræ. It is very distinct in appearance and character from other pseudomopids, resembling superficially species of *Pelmotosilpha* more than anything else. The specialization of the metanotum would suggest the African genus *Pseudoderopeltis* belonging to the same subfamily as *Pelmatosilpha*. At this writing it seems best to regard this genus as a highly and independently developed member of that section of the genera group Ischnopteræ made up of forms having the ventro-cephalic margin of the cephalic femora biseriately spinulose.

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[1] From *νηλιπος*, bare footed, and *φυγας*, fugitive, in allusion to the lack of arolia and also its secretive habits.

GENERIC DESCRIPTION.—Form elliptical. Head broad, pyriform in outline, subdeplanate. Eyes lateral, widely separated, short, not prominent. Ocellar spots small. Palpi with third and fifth joints subequal in length, fourth slightly shorter. Pronotum semi-ovate in outline, greatest width caudad, in section vaulted, surface without impressions. Tegmina subcorneous, abbreviate, narrowly overlapping mesad, distad obliquely arcuate-truncate; venation indicated but not pronounced: marginal field broad; anal field large, clearly evident, but anal vein not impressed. Wings vestigial, lateral articulate pads complete covered by tegmina. Metanotum with margin specialized in both sexes. Abdomen with dorsal surface unspecialized except in retraction of seventh tergite and broad emargination of eighth tergite in both sexes. Male genitalia with subgenital plate asymmetrical, styliferous. Limbs robust, flattened, caudal tibiæ inflated. Cephalic femora armed ventro-cephalad with large spines proximad and mesad, followed by a series of very small numerous spines and an apical series of three elongate spines; ventro-caudal margin armed with spines. Median and caudal femora with strongly spined ventral margins. Median caudal tibiæ heavily spined. Tarsi elongate, slender, surpassing the tibiæ in length; pulvilli apical, present on four proximal joints; ventral surface of metatarsus and the two following joints biseriately spinulose; arolia absent; tarsal claws unspecialized.

GENOTYPE.—*N. ramsdeni*, new species.

Nelipophygus ramsdeni,[1] new species

Plates IX, Figures 8 to 13; X, Figures 1 to 3

TYPE.—Male; Rio Seco, San Carlos Estate, near Guantanamo, Oriente Province, Cuba. Elevation, 200 feet. April 24, 1914. (C. T. Ramsden; under rotten bark.) [Academy of Natural Sciences of Philadelphia, Type No. 5358.]

Size very large (for the subfamily); form elongate elliptical, attenuate caudad; surface moderately polished.

Head almost entirely covered by pronotum when seen from the dorsum; when seen from cephalic aspect broad pyriform in outline, the greatest width across eyes contained one and one-quarter times in greatest depth of head; occipital outline regularly arcuate, eyes not at all projecting beyond head outline; area between eyes slightly greater than one-half depth of head: ocellar spots small and circular, placed close to the antennal scrobes, slightly more than one-half as far apart as the eyes, slightly closer together than the internal portion of the antennal scrobes; a pair of ocelliform spots placed slightly ventrad of the most approximate point of the antennal scrobes, of slightly larger size than the ocelli and faintly more approximate; face with its lateral margins moderately arcuate convergent ventrad of eyes. Eyes not reaching ventrad of the ventral border of the antennal scrobes, in basal outline broad dorsad with an oblique arcuation cephalad, narrowed and subequal in width in ventral three-fifths, with the ventral margin rounded. Palpi relatively short, subcompressed; third joint relatively deep, faintly arcuate; fourth joint slightly shorter than third joint, moderately infundibuliform, distad oblique subtruncate; fifth joint subequal in length to the third joint, no deeper than distal portion of fourth joint, sublanceolate, the dorsal margin straight, apex narrowly rounded when seen in profile. Antennæ surpassing the body in length, proximal joint short and thick, third joint slightly longer than second joint, fourth and succeeding joints short, these very abbreviate proximad, elongating slightly distad.

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[1] Dedicated to its collector, our friend, Dr. Charles Torre Ramsden, of Guantanamo, Cuba, as a token of appreciation of his indefatigable energy and interest in searching for and making known the zoölogical treasures of the island of Cuba.

Pronotum with greatest length contained about one and one-third times in greatest width: cephalic margin well arcuate, regularly passing by a broadly rounded and hardly appreciable angle into the broadly arcuate and diverging lateral margins; latero-caudal angles rounded, slightly more obtuse than a right angle; caudal margin broadly subtruncate; all margins cingulate. In transverse section the pronotum is regularly arcuate, the area adjacent to the latero-cephalic angles moderately but broadly decurved. Surface of pronotum without impressions.

Tegmina subquadrate, reaching to second tergite; greatest width of tegmen contained one and two-fifths times in greatest length of same. Costal margin of tegmina straight in proximal half, narrowly arcuate at extreme base, thence strongly and regularly arcuate to the disto-sutural angle; sutural margin almost straight; in transverse section the tegmina are decurved laterad, the costal section moderately embracing the dorso-lateral portions of the meso- and meta-thorax and base of abdomen. Marginal field of tegmina broad, taking up over one-third of tegminal width, not clearly defined from the sutural field; anal field very large proportionately, taking up over one-half the width and two-thirds of the length along the sutural margin, pyriform. Scapular and discoidal tegminal fields in general with venation moderately radiating; discoidal sectors seven in number; axillary veins seven in number. Wings reaching to the free margin of the median segment, longer than broad.

Metanotum with its entire distal margin between the tegmina developed into a broadly transverse, distad subtruncate lamella, the margin of which is irregularly, sparsely and not at all deeply serrulate; on the median line is a distinct, acute, spiniform projection.

Abdomen not greatly specialized, the lateral margin of each tergite weakly arcuate and cingulate, the caudo-lateral angles slightly acute produced, caudal margins of proximal tergites subtruncate, passing to moderately arcuate-emarginate on fifth tergite; sixth tergite with distal margin arcuate-emarginate laterad, moderately broad arcuate mesad; seventh tergite hidden under sixth except for lateral angles; eighth tergite with distal margin arcuate-subtruncate emarginate, exposing the basal section of the supra-anal plate, caudo-lateral angles acute-angulate.

Supra-anal plate transverse, greatest length contained slightly more than twice in greatest width; median portion of distal margin strongly arcuate with a very faint, shallow and broad emargination mesad; surface of plate mesad slightly and broadly elevated, this area with scattered depressed hairs; distal margin with two series of long hairs, one on each side of the median emargination. Cerci relatively short and thick, composed of twelve segments, these heavy and subequal in proximal half, each slightly narrowed proximad, the cerci as a whole strongly tapering distad, the segments there submoniliform, apex bluntly acute; dorsad hardly more deplanate than ventrad. Subgenital plate asymmetrical, relatively small; distal margin reading (in inverted specimen) from sinistral to dextral side is as follows: oblique subtruncate for one-third of margin, then weakly obtuse-angulate, the dextro-mesal portion of the margin then broadly arcuate to a corresponding point on the dextral side, followed by oblique truncation dextrad, in profile the plate is weakly decurved at its greatest production; dextral style inserted at apex of plate, sinistral style between it and the sinistral weak angulation, both styles short and thick, peg-like, slightly thickened distad and there with a number of short, radiating, chætiform hairs. Genital hook of the usual style but much flattened. Internal genitalia also represented by a stout, straight, chitinous, fang-like spine dextrad.

Limbs flattened, the coxæ, femora and tibiæ stout, the tarsi very slender and elongate. Cephalic femora with ventro-cephalic margin armed with large spines proximad and mesad, these decreasing in length distad on mesal section, distal portion of margin with a contrasted row of very short and relatively uniform, closely placed spines; apical group of spines three in number, large, increasing in length distad, the terminal one very elongate; ventro-caudal margin with four large spines, mesad and distad, the apical the longer. Ventral margins of median and caudal femora each armed with six large, well-spaced spines, of which the distal one is larger than the others. Median and caudal tibiæ with heavy, weakly curved spines on both the flexor and extensor surfaces, these microscopically striate on their mesal surfaces, the spines of the caudal tibiæ appreciably increasing in length distad: dorsal and ventral surfaces of median and caudal tibiæ bare; median tibiæ weakly and caudal tibiæ strongly, expanding. Tarsi elongate, very slender, always surpassing the accompanying tibiæ in length; caudal metatarsus two-thirds as long as caudal tibia and slightly longer than remaining tarsal joints united; ventral surface of caudal metatarsus and second and third joints biseriate spinose ventrad, fourth joint[1] with lateral apical spines only; pulvilli distinct on first to fourth joints, apical; arolia absent; tarsal claws simple, slender, falciform, unspecialized.

ALLOTYPE.—Female; "El Peru," Monte Libano, near Guantanamo, Oriente Province, Cuba. April 13, 1913. (Chas. T. Ramsden.) [Academy of Natural Sciences of Philadelphia.]

Differing from the description of the male sex in the following features.

Ocellar spots slightly smaller and more remote from one another than in male.

Tegmina faintly more transverse, greatest width contained one and three-tenths times in greatest length of same.

Eighth abdominal tergite truncate, with lateral angles moderately produced and a very faint median emargination. Supra-anal plate transverse trigonal, in general form similar to but more produced than in male; surface of plate with but faint indications of mesad elevation, few surface hairs and marginal hairs reduced in length and number. Cerci less attenuate distad. Subgenital plate simple, of medium size, scoop-shaped, lateral portions moderately ascending, ventral surface of plate well arcuate in transverse section; distal margin broadly arcuate.

Caudal tibiæ very distinctly expanding, but less markedly than in male sex.

General color of dorsal surface ranging from dark maroon to morocco red, the tegmina largely darker, as if washed with fuscous, and narrowly and indefinitely

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[1] Type has but four joints present in only remaining entire caudal tarsus; of other limbs present, normal.

washed with auburn on margins. Pronotum unmarked. Abdomen with segments distinctly but not solidly bordered distad with fuscous. Cerci argus brown proximad, passing to raw sienna distad, ventral surface occasionally with segments banded with auburn proximad. Ventral coloration between morocco red and chestnut, the coxæ and trochanters more sanford's brown to orange-rufous. Head with clypeus, labrum, palpi and labium light orange-yellow to deep chrome; antennæ mikado orange proximad, briefly passing to apricot yellow; eyes fuscous; ocellar spots yellowish white; accessory facial spots mummy brown; area between antennal bases occasionally (allotype) suffused with mummy brown. Caudal tibiæ and tarsi passing to claret brown or very dark claret brown; spines darkened at tips. Flexor surfaces of femora citron yellow to mustard yellow.

Measurements

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen[1]
♂, Rio Seco, Cuba, type..........	19.5	6.6	8.5	7.5
♀, Monte Libano, Cuba, allotype..	18	5.8	7.4	6
♀, Guantanamo, Cuba, paratype..	19	6.5	8.2	6.8

	Greatest Width of Tegmen	Length of Caudal Tibia	Length of Caudal Tarsus
♂, Rio Seco, Cuba, type.....................	5.3	6.7	7.8 mm.
♀, Monte Libano, Cuba, allotype............	4.6	6.5	7.7
♀, Guantanamo, Cuba, paratype............	5.3	7	8.3

In addition to the type and allotype of this species we have before us an adult female from Guantanamo, Oriente Province, Cuba, collected by Mr. Ramsden, without date, and two immature females, one in the instar preceding maturity and the other much younger, taken with the type. Of these the adult female can be considered paratypic.[2]

We have no comments to add to the description of this most peculiar and interesting genus and species, except that the elongation of the tarsi is not at all as pronounced in the immature specimen in the instar preceding maturity, as in the adults.[3]

Symploce Hebard

This genus is distributed over the tropics, and to some extent the subtropics, of both hemispheres, the number of species at present known actually referable to the genus being uncertain, as many yet figure in the literature as species of *Ischnoptera*. As these species are studied in the light of present day knowledge of the group, we will secure a clearer conception of the distribution and development of the genus. As far as definitely known at this time the genus occurs in tropical America solely in the West Indies, the Florida Keys, Mexico and Lower California, while it is also found in southern and eastern Africa and the Hawaiian Islands. The species are all pale ochraceous and very much alike in general appearance. The male genital features, however, are very distinctive and of the greatest value in separating the species.

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[1] Taken along sutural margin.

[2] This specimen has one of the caudal tarsi but four jointed, the other of the normal five jointed type.

[3] This specimen has four joints only present in one cephalic tarsus and one median tarsus. The very immature specimen has five joints in all remaining tarsi.

Hebard[1] has published a critical paper upon the American species of the genus, in which will be found full descriptions and detailed figures of most of the forms, which the student must consult in examining material of this genus. As the male differential characters are very difficult to express in words, we have made no effort to construct a key, as an examination of the figures referred to will be of far more service than any word analyses. Two new species of the genus are here described.

Symploce hospes (Perkins)

Phyllodromia hospes Perkins, 1899, 'Fauna Hawaiiensis,' II, p. 5. Kauai and Honolulu, [Hawaiian Islands].

A specimen of this widely distributed species, in the collection of the United States National Museum, was taken, in 1917, from *Anona* (presumably the fruit) received at Washington, in quarantine, supposedly from Antigua. This is the first record of the species from the West Indies, properly speaking, although the type of the synonymous *Symploce lita* came from Key West, Florida. The species also occurs in eastern Mexico (Vera Cruz), Lower California (San José del Cabo) and in the Hawaiian Islands. Hebard has recently discussed the nomenclature of the species,[2] correctly assigning Perkins' name to this insect, although the latter's original description is of little value in a group as intricate and difficult to study as the Pseudomopinæ. Hebard's descriptions of the synonymous *Symploce lita*[3] are very full and by far the most important information we have on the characters of the species.

The specimen here reported is of very similar proportions to the male from Vera Cruz, Mexico, recorded by Hebard, and its dimensions are: length of body, 11.6 mm.; length of pronotum, 3.3; greatest width of pronotum, 3.9; length of tegmen, 11; greatest width of tegmen, 3.6; length of caudal tibia, 4.5.

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[1] 1916, Trans. Amer. Entom. Soc., XLII, pp. 357–370, Pls. xvii-xviii.

[2] 1922, Occas. Papers Bernice Pauahi Bishop Mus., VII, pp. 330–331.

[3] 1916, Trans. Amer. Entom. Soc., XLII, pp. 357–359, Pl. xvii, fig. 8, Pl. xviii, figs. 1–4; 1917, Mem. Amer. Entom. Soc., No. 2, pp. 151–153, Pl. ii, figs. 16–20.

Symploce jamaicana (Rehn)

Ischnoptera jamaicana Rehn, 1903, Trans. Amer. Entom. Soc., XXIX, p. 264. ♂, ♀; Jamaica; [Port Antonio], Portland [Parish], Jamaica.

Jamaica.—Kingston, VII, 4, 1920, (R. and H; very common at night in short dry grass in roadside gutter), 9♂, 33♀, 3 immat. indiv., [Heb. Cln. and A. N. S.P.]. Beach at south end of Long Mountain, St. Andrew Parish, five miles east of Kingston, VIII, 5, 1923, (Rehn; under beach trash in stony wash of Hope River), 6 immat. ♀, [A. N. S. P.].

Porto Rico.—Ensenada, Department of Aguadilla, VI, 14–19, 1915, (Lutz; on side hill), 1 ♀.

The species has been recorded by Hebard,[1] in his study of the genus, from Gregory Park, St. Andrew Parish, and Montego Bay, Jamaica, and Little Cayman Island. The present Porto Rican record, the first from that island, is probably that of an accidental commercial importation.

On the outskirts of Kingston we found this species at night very common in a roadside gutter, often a number clustered together, not particularly active and very rarely flying.

The immature individuals from near the south end of Long Mountain represent two instars.

Hebard has already analyzed the characters of the species. The great difficulty in determining females of this genus, and particularly of the West Indian *Capitata* Group of species, has caused us to make a careful search for ambisexual features which would supplement the very marked diagnostic features found in the male sex. We have found some features in the maxillary palpi, which to a certain degree furnish assistance, at least in grouping species. The palpi are occasionally much thinner and more compressed and also deeper, in some individuals than in others, and this, to at least a degree, appears to be due to drying or shrivelling. This possibility furnishes an element of uncertainty in using the form of the profile and dorsal outline of the palpi for comparison, but, in the *Capitata* Group at least, the relative proportions of the fourth and fifth joints seem to remain fixed within given species. The species *jamaicana*, *cristata* and *morsei* have these segments subequal in length, in *bilabiata* and *flagellata* the fifth is faintly the longer, and in *bicolor* and *capitata* the fifth is appreciably longer than the fourth. This feature is of but relative value as a determinative aid, but it will serve to eliminate certain species from consideration and thus assist in naming material.

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[1] 1916, Trans. Amer. Entom. Soc., XLII, p. 359.

Symploce cristata, new species

Plate X, Figures 4 to 5

This species shows distinct relationship to *S. morsei* Hebard. From that insect the male before us differs in the very slightly narrower interocular space and distinctive specialization of the dorsal surface of the abdomen. The supra-anal plate is similar (with none of the asymmetry developed in *S. bilabiata* here described), though showing a slightly greater tendency toward bilobation, while the specialization of the subgenital plate differs only in the disto-sinistral angulation of the distal scute and the heavier adjacent sinistral process.

Like *morsei*, the present species is less reddish than *S. capitata* (Saussure) and *bilabiata*.

TYPE.—Male; Port-au-Prince, Haiti, Hispaniola. [Hebard Collection, Type No. 864.]

DESCRIPTION OF TYPE.—Size large for the genus; form moderately robust.

Interocular space slightly narrower than occipital depth of eye and three-quarters as wide as that between the ocellar areas. Ocelli small, with surfaces of ocellar areas slanting to and rounding evenly into the interocellar area. Maxillary palpi with fourth and fifth joints subequal in length.

Pronotum of form usual in genus, moderately transverse, subtrapezoidal in outline, greatest length contained about one and one-third times in greatest width of same, which is at caudal third of length.

Tegmina surpassing apex of abdomen by slightly less than length of pronotum, largely subequal in width, greatest width contained about three times in greatest length of same. In general form tegmina are as described for *S. bilabiata;* costal veins less longitudinal and more oblique than in latter species.

Median segment specialized much as in *capitata* and *morsei;* with convergent ridges meso-proximad, caudad of which is an extensive concave area, furnished cephalad with numerous elongate scattered hairs radiating cephalad and laterad. Succeeding tergites to seventh, as in *capitata*, with latero-caudal angles briefly acute-angulate produced except those of seventh; eighth tergite very strongly concave, its lateral portions produced, forming cupped angulate portions between which the caudal margin is strongly concave; ninth tergite rather narrowly visible but bearing a stout knob mesad, which is furnished on each side with an erect crest of agglutinated hairs, all of the same length and curled slightly outward.

Supra-anal plate with surface ascending (but showing weak though extensive concavity on each side) to a distinct, rounded, proximal, transverse ridge, in this region supplied laterad with numerous, short hairs; free margins straight and weakly oblique produced, then suddenly produced in meso-distal half with margins convex, so that at their juncture a nearly rectangulate emargination occurs, the produced portion of the plate in consequence being almost bilobate and nearly twice as wide as long. Subgenital plate with dextral free margin oblique and broadly convex from base of cercus to median point, there the plate is produced in a moderately large but delicate and moderately inset scute, which is rounded to its sinistro-distal portion, a rectangular point there occuring; beyond this a projection extends an equal distance caudad, fused in most of its length with the scute but homologous to the flagellate process developed in *morsei*; the sinistral portion of the free margin of the subgenital plate is weakly oblique and nearly straight to the base of this process.

Limbs and armament of same as characteristic of the genus.

Allotype.—Female; La Serre, Haiti, Hispaniola. Elevation about 125 feet. March 3, 1922. (F. E. Watson.) [American Museum of Natural History.]

Description of Allotype.—Differing from the description of the type in the following noteworthy features.

Occipital interocular space slightly greater than occipital depth of eye, subequal to that between ocellar areas.

Dorsum of abdomen unspecialized. Supra-anal plate in general form essentially as in *S. bilabiata* except that distal emargination is smaller and more delicate in character. Subgenital plate essentially as in *S. bilabiata.*

Head, underparts and limbs light ochraceous-buff. Head occasionally (type only) with a suffusion of prout's brown in the interocellar area. Five abdominal sternites each with a dot or small suffusion of blackish brown on each side, occasionally with both, coxæ flecked with the same color. Spines of limbs ochraceous-tawny. Pronotum ochraceous-buff, disk weakly tinged with tawny. Tegmina translucent, weak ochraceous-buff. Dorsal surface of abdomen buff proximad and narrowly laterad, remaining portions suffused with prout's brown, becoming blackish toward the clearly defined pale lateral margins on the more distal of the broad tergites. Supra-anal plate of female bimaculate with prout's brown. Cerci dresden brown.

Measurements

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Port-au-Prince, type	13.4	3.5	4.5	13	4.4 mm.
♂, Maneville, paratype.	10	2.4	3.5	10.3	2.9
♀, La Serre, allotype...	12.3	3	3.9	12	3.8
♀, Sources Puantes, paratype............	10.3	2.7	3.8	11.2	3.6

In addition to the type and allotype we have before us the following series, all the adults of which we consider paratypes: Sources Puantes, twenty kilometers north of Port-au-Prince, Haiti, III, 26, 1922, (F. E. Watson), 1♀; La Serre, Haiti, elevation about 125 feet, III, 3, 1922, (F. E. Watson), 3♂, 2♀, 1 immature ♀; Pont Beudet, Haiti, elevation about 100 feet, III, 3–4, 1922, (F. E. Watson), 1♀; Maneville, Haiti, elevation about 60 feet, II, 6–10, 1922, (F. E. Watson), 1♂.

All of these specimens are from the collection of The American Museum of Natural History.

An examination of the whole series shows that in all but two females, one from Sources Puantes and the other from Pont Beudet, five tarsal joints are present on all complete tarsi, while the first mentioned of the two exceptions has four joints only in one caudal tarsus, and the second mentioned has one tarsus of each pair of limbs with but four joints.

Symploce capitata (Saussure)

Bl [*atta*] *capitata* Saussure, 1862, Rev. et Mag. de Zool., (2) XIV, p. 167. ♂; Cuba.

The nomenclatural vicissitudes of this species, and the characters and variation of it, have been discussed by Hebard.[1] He recorded it from the following localities in Cuba: Viñales, Pinar del Rio Province; Cabañas, Pinar del Rio Province; Havana; Cabana, Havana; San Antonio, Havana Province; Cienfuegos, Santa Clara Province; Cayamas, Oriente Province and San Carlos Estate, Guantanamo, Oriente; also from the Isle of Pines. Caudell[2] has recorded this species from Antigua, on the basis of female material. We have one of his specimens before us, and the shape of the eyes and interocular space shows it does not represent *capitata*, but instead is nearer *bilabiata*, under which it is discussed.

We have nothing to add to Hebard's treatment, except to call attention to the fact that the fourth and fifth palpal joints show a considerable difference in length, the former being distinctly shorter than the latter, in this resembling *bicolor*, which, however, is otherwise a very different species.

Symploce morsei Hebard

Symploce morsei Hebard, 1916, Trans. Amer. Entom. Soc., XLII, p. 365, Pl. xviii, figs. 11–13, ♂, ♀; Nassau, New Providence Island (type locality), Bahamas; Mangrove Cay, Andros Island, Bahamas; Eleuthera Island, Bahamas.

Bahamas.—Nassau, New Providence Island, V–VI, 1917, (W. M. Mann), 1 ♀. Andros Island, V–VI, 1904, (W. M. Wheeler), 1 ♀. Fish Hawk Key, Andros Island, V, 19, 1904, (W. M. Wheeler), 1 ♀. Mangrove Key, Andros Island, V, 25, 1904, (W. M. Wheeler), 1 ♂.[3] 1 ♀; V–VI, 1917, (W. M. Wheeler), 1 ♀.

Hispaniola.—Port-au-Prince, Haiti, 1 ♂, 1 ♀, [Paris Museum].

The localities given here in the text and reference comprise all known for the species, which was thought to be restricted to the Bahaman group. It is possible, however, that the Port-au-Prince individual here reported may have been an adventive one, although future work alone can determine this point.

This species has the fourth and fifth palpal joints subequal in length, as in *jamaicana*, *bilabiata* and *cristata*.

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[1] 1916, Trans. Amer. Ent. Soc., XLII, pp. 361 to 365.

[2] 1922, Univ. of Iowa Studies in Nat. Hist., X, No. 1, p. 21.

[3] Recorded by Rehn, in 1906, as *Ischnoptera blattoides*, which is now know to be exclusively an Old World species, but at that time considered virtually circumtropical.

Symploce bilabiata,[1] new species

Plate X, Figures 6 to 9

A very distinct species in the male sex, probably as nearly related to *S. capitata* (Saussure), from Cuba, as to the other forms of the *Capitata* Group, but showing most resemblance to *S. flagellata* and *S. morsei* Hebard. The chief differential features are in the male genitalia, in the supra-anal plate being markedly bifid distad, this condition also somewhat asymmetrical, in the disto-ventral section of the subgenital plate of the same sex having an area of tooth-like spines, and in the shape of the dextral style, which is broad, short and flattened, with a rounded node dextrad.

The females are extremely hard to distinguish from those of *morsei* and *flagellata*. The longer fifth palpal joint of *bilabiata* will distinguish it from *morsei*, while from *flagellata* the narrower and more elongate marginal field of the tegmina, the more longitudinal and less obliquely divergent tegminal costal veins, as well as the wider medio-discoidal area of the wing, when compared with the medio-ulnar area, will be found useful. The degree of divergence of the tegminal costal veins from the discoidal vein is subtle, but a feature of considerable value, while the width of the wing areas is also of assistance in separating the species.

TYPE.—Male; Culebra Island, West Indies. March 4, 1906. (W. M. Wheeler.) [American Museum of Natural History.]

Size medium; form elongate elliptical, subdepressed; surface moderately shining.

Head narrowly visible cephalad of pronotal disk; occipital and eye outline regularly but not strongly arcuate; interspace between eyes slightly greater than the depth of eye at occiput; general outline of head trigonal-pyriform, the greatest width across eye slightly less than greatest length of head, outline of eyes regularly arcuate; face moderately deplanate. Palpi with third joint moderately stout, slightly arcuate proximad when seen in profile; fourth joint about three-quarters as long as third joint, moderately infundibuliform; fifth joint slightly longer than fourth joint, in profile moderately deep proximad, narrowing distad, dorsal line straight. Eyes not at all prominent, in basal outline subreniform, regularly narrowing ventrad, broad dorsad. Antennæ slightly surpassing the body in length; proximal joint short, slightly inflated.

Pronotum moderately transverse, of the form usual in the genus, greatest length contained one and one-third times in greatest width, greatest width situated distinctly caudad of the middle; cephalic margin truncate mesad, rounding into the lateral margins, which are oblique, arcuato-truncate, caudad diverging to the rounded obtuse-angulate lateral angles, thence briefly converging subtruncate to the weakly produced and very broadly obtuse-angulate caudal margin; all margins cingulate; surface of pronotum without impressions; subequal lateral portions in section strongly deflexed, narrowly rounding into the transverse weakly arcuate disk.

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[1] This is the species recorded by Rehn (1910, Bull. Amer. Mus. Nat. Hist., XXVIII, p. 73) from Culebra Island, as *Ischnoptera rufescens*. This latter specific name is now known to be a synonym of *Ischnoptera rufa rufa*.

Tegmina surpassing the apex of the abdomen by approximately the length of pronotum, lanceolate, in greater part nearly subequal in width, the greatest width, which is at distal fourth, contained three and one-fifth times in greatest length; costal margin moderately arcuate proximad, nearly straight for the greater portion distad, briefly rounding to the rounded obtuse-angulate apex, which is nearer the costal margin; sutural margin in greater part nearly straight, in distal fourth obliquely arcuate to the apex. Marginal field relatively narrow, elongate, occupying one-third of tegminal length; scapular field moderately broad; anal field moderately elongate, subpyriform, in length equal to two-fifths of tegminal length, apex blunted. Costal veins numerous, proximad diverging from the discoidal vein at a very acute angle and in general in that section more longitudinal than oblique; discoidal sectors longitudinal, eight in number (including ulnar vein); axillary veins seven in number. Wings equalling the closed tegmina in length, moderately broad; apex of wing rounded obtuse-angulate; intercalated triangle of medium size, elongate trigonal, its axis slightly longer than one-fifth of wing length along anal vein; costal veins sixteen in number, a number of the distal ones being forks of a common ramus, of the proximal ones derived from the mediastine vein, oblique, very faintly thickened; discoidal vein furcate slightly distad of middle of wing; medio-discoidal area broad, one and one-half times as broad as medio-ulnar area, with transverse veinlets regular and with areolets large, few and subquadrate; ulnar vein with one[1] to two complete and two incomplete rami; axillary vein triramose, the proximal one well removed from the other two, which are closely grouped.

Abdomen with median segment specialized in having a central group of adpressed agglutinated hairs directed caudad, covering a low "boss," laterad of which are basin-like depressions; succeeding tergites to fifth moderately rectangulate produced caudo-laterad; sixth tergite rounded rectangulate caudo-laterad, broadly arcuate-emarginate mesad; its surface with a similarly arcuate and deep transverse sulcate impression; seventh and eighth tergites very narrow, the seventh with a group of sparse, erect hairs. Supra-anal plate transverse, depressed, asymmetrically produced mesad into a pair of rounded, decurved lobes, the dextral as broad as long and narrowing distad, the sinistral more slender. Cerci subfusiform, strongly tapering distad, mesad and distad the articles being moniliform and narrowed at their bases, composed of twelve segments, dorsal surface of cerci subdeplanate, each segment ventrad inflated and with a group of chætiform and unmodified hairs. Subgenital plate rather small, slightly asymmetrical; margin beginning on dextral side, first with a moderately rounded rectangulate angle or shoulder which fits about the cercal base, then a broad and shallow arcuate emargination, this terminating at a low, circular node, which is the dextral style, and immediately dextrad of which the margin is developed as an irregularly subtrigonal lamella of chitin, reflexed caudad; sinistral style erect, spiniform, acute, slightly sinuato-falcate distad, sinistral portion of margin arcuate-emarginate, not fitting around the cercal base; ventral surface of subgenital plate bearing distad, in the region of the styles, a mat of adpressed, dorso-caudad directed, spinules.

Limbs and armament of same as characteristic of the genus.

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[1] In this case it is furcate very shortly after its divergence from the ulnar vein.

Allotype.—Female; same data as type, except date of capture is March 6, 1906. [American Museum of Natural History.]

Differing from the above description of the type in the following features.

Head hardly visible cephalad of pronotal disk; interspace between eyes subequal to the depth of eye at occiput.

Pronotum slightly more decidedly transverse, greatest length contained one and two-fifth times in greatest width.

Tegmina with greatest width contained three times in greatest length of same.

Abdomen with median segment unspecialized; seventh and eighth tergites without median specialization of marginal form or structure. Supra-anal plate transverse trigonal, the greatest median length contained nearly twice in greatest width, the lateral portions of margin of plate faintly arcuate-emarginate, the apex rounded, briefly emarginato-fissate, the whole margin with a series of chætiform hairs, directed dorso-caudad, most numerous about apex; surface of plate excavate proximo-laterad. Subgenital plate large, transverse, the margin sinuato-arcuate, cercal emargination distinct but shallow, distal margin with a faint emarginate tendency.

General color above (with closed tegmina) ochraceous-buff, passing in certain females into weak ochraceous-orange; below light ochraceous-buff to ochraceous-buff. Head unmarked; eyes piceous to weakly mottled with mummy brown; antennæ usually of general dorsal color; palpi usually with fourth and fifth joints tipped with mummy brown. Pronotum with the deflexed lateral portions warm buff to ochraceous-buff, contrasted with disk. Tegmina with marginal field colored similarly to the lateral portions of the pronotum. Wings clear hyaline to weakly infumate; veins largely pencilled with snuff brown to bister, the ulnar, axillary and radiate veins of the deeper tone; region of the costal veins narrowly pale ochraceous subopaque, submarginally appreciably infumate with bister for a distance. Abdomen with dorsal surface largely pale ochraceous-buff to ochraceous-buff, large intermarginal sections, becoming deeper in tone distad and usually uniting on the distal second to third tergites, mummy brown to fuscous, the lateral pale margins of the abdomen relatively broad and subequal, the narrow distal segmental pale margins occasionally obsolete; supra-anal plate pale, occasionally with paired lateral dark spots. Cerci of the dorsal abdominal color dorsad, ventral surface completely or in large part fuscous. Coxal spots and lateral series of dots on ventral abdominal surface fuscous; subgenital plate with a medio-longitudinal blotch of pitch brown. Limbs of the dorsal coloration.

The San Juan female and one of the same sex probably from Culebra Island exhibit a most striking phase of coloration, having all the tibiæ and the greater portion of the caudal tarsi deep piceous, as well as the antennæ exclusive of the proximal joint, most or all of the fourth and fifth palpal joints and all of the cerci except a pale medio-dorsal line. The subgenital plate also has the median blotch larger and solidly colored. This coloration causes a strong superficial resemblance to *Pseudosymploce elongata*, to which the present species is in no way closely related. Additional information relative to the actual distribution and environment frequented by this color phase may show some definite correlations.

The type, allotype, and the other specimens presumably from Culebra Island have been dried from alcohol, but the coloration seems not to have been seriously affected.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Culebra Island, type	10.6	2.9	3.9	10.6	3.3 mm.
♂, Probably Culebra Island[2]...........	10.7 (10.5–11)	3.1 (3–3.2)	4 (4–4.1)	10.3 (10.2-10.5)	3.6
♀, Culebra Island, allotype................	10.2	3.4	4.7	11.9	4
♀, Culebra Island, paratype............	10.7	3.4	4.6	damaged	
♀, San Juan, Porto Rico	13	3.6	5.2	13	4.1

In addition to the type and allotype we have before us a paratypic female from Culebra Island, taken March 5, 1906, by the same collector and in the same series; two males and one female probably from Culebra, but with no data except "1" and "3," in The American Museum of Natural History[1]; a female from Aguas Claras, Porto Rico,[2] January 19, 1914, in the Hebard Collection; and a female from Dorado, Department of San Juan, Porto Rico, February 11–14, 1914 (Lutz; sifting in sea-grape thicket on sandy soil), in the American Museum collection. We have also seen an immature specimen from Culebra Island, March 1906, (W. M. Wheeler), from the American Museum series.

It would appear as if *S. bilabiata* occurred over at least a portion of Porto Rico, Culebra Island and probably the others of the Virgin Island group.[3]

The series of the present species shows that the absence of one of the usual five tarsal joints is a frequent feature. All of the males seen have five joints in all the tarsi preserved. But one of the females has five joints in all the undamaged tarsi, while the others have one or more tarsi with but four joints; in three the cephalic tarsi show four in one and five in the other; two have both caudal tarsi four-jointed, yet a third has them five-jointed. The number of discoidal sectors varies from seven to nine, while the complete ulnar rami number three in the Dorado female.

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[1] Dr. F. E. Lutz is unable to shed any light on the exact locality from which these specimens were obtained.

[2] Recorded by Hebard (1916, Trans. Amer. Entom. Soc., XLII, p. 369) as *S. flagellata*.

[3] The female from St. John, Virgin Islands, recorded by Hebard (1916, Trans. Amer. Entom. Soc., XLII, p. 369) as *flagellata*, is probably *bilabiata*, but the individual is now not accessible for examination.

The emargination of the supra-anal plate of the female varies in its width and fissate character, being nearly V-emarginate in certain individuals. Differences in compression and stress of the plate while drying may be influencing factors in this variation.

Caudell[1] has recorded as *S. capitata* two females from Antigua, one of which is before us. The species represented is not *capitata*, as the shape of the marginal field of the tegmina, of the eyes and width of interocular space show. As females of this genus are extremely difficult to determine without accompanying males, we would not hazard a positive determination of the Antigua female, except to say that it is nearest to *bilabiata*, although probably representing a distinct and undescribed species, the male sex of which must be known before its correct position can be ascertained.

Symploce flagellata Hebard

Plate X, Figure 10

Symploce flagellata Hebard, 1916, Trans. Amer. Entom. Soc., XLII, p. 367, Pl. xviii, figs. 14 to 17. ♂, ♀; Saona Island, Hispaniola; Desecheo Island, Porto Rico (type locality); Mona Island, Porto Rico; Aguas Claras, Porto Rico (=*S. bilabiata*); St. John, Virgin Islands (probably =*S. bilabiata*).

Hispaniola.—Haiti, 1 ♀, [M. C. Z.].

A re-examination of all the original material of this species now accessible, as well as the above specimen, shows that in all probability the present species does not occur on the island of Porto Rico itself or in the Virgin Islands. The difficulty encountered in correctly working out the distribution of this species and the preceding new one—*S. bilabiata*—is that females are quite hard to distinguish. The characters which we have used to separate individuals of that sex we have discussed in the diagnosis of *S. bilabiata*, while we have already commented upon the distribution of that species.

Of the originally included specimens, the Saona Island female is *flagellata*, as is true of all the Desecheo and Mona Islands adults. The Aguas Claras females are probably both *bilabiata*—the one now in hand is clearly that species. The St. John, Virgin Islands female originally reported, is not in hand at present, but in all probability is *bilabiata*, the species found on Culebra Island.

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[1] 1922, Univ. of Iowa Studies in Nat. Hist., X, No. 1, p. 21.

Symploce bicolor (Beauvois)

Blatta bicolor Beauvois, 1805, 'Ins. Rec. Afr. Amér.,' p. 183, Pl. Orth. I B, fig. 6. Santo Domingo.

Hispaniola—Gonave Island, Haiti, VII, 12, 1922, (O. W. Barrett), 1 ♀, [Hebard Cln.]. Blanton Mine, north of San Cristobal, Province of Santo Domingo, Dominican Republic, VII, 26, 1917, (H. Morrison), 1 ♀, [U. S. N. M.].

Hebard[1] has analyzed the characters of this peculiar species and at this writing the sole additional information regarding it we possess is the material here recorded. The exact localities previously recorded by Hebard are: Azua, Province of Azua, and San Francisco Mountains, thirteen kilometers north of San Cristobal,[2] Province of Santo Domingo, Dominican Republic, Hispaniola.

NESOMYLACRIS,[3] new genus

This group of two species occupies a position related on one hand to the genus *Symploce* and on the other, very probably, to the African genus *Temnopteryx*. The latter genus has been recorded from the Americas numerous times, but in practice it has been such a dumping ground for all types of pseudomopids which happened to possess truncate or subtruncate tegmina, that, in general, a generic assignment there meant relatively nothing, unless qualified by comparison with other, clearly defined species, from which one could get a truer idea of real affinity. The genotype of *Temnopteryx* is the South African *phalerata* Saussure, and at this writing that species is represented before us by several females, so that it is possible for us to get, for the first time in our studies, a clear idea of its characters. We are now able to state definitely that we have seen no species from the American continent which can be generically referred to the genus *Temnopteryx*.[4]

In the reduced and truncate or sublobiform tegmina, the two species which are here placed in a new genus show a general and superficial resemblance to that host of species of a variety of real affinities which have been unceremoniously dumped in the genus *Temnopteryx*. A great number of these "species" have been or are being demonstrated to be the female sexes of very different looking males which belong to a number of genera, while others, of which brachypterous males are also known, represent genera which show differences in spination, abdominal specialization, tarsal and palpal structure which have been overlooked or ignored.

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[1] 1916, Trans. Amer. Entom. Soc., XLII, pp. 369–370.

[2] See p. 11, footnote 1.

[3] From *νησις*, an islet, and *μῦλακρὶς*, cockroach.

[4] An analysis of the available material and descriptions of the species from the mainland of America and its adjacent islands, which have been referred to the genus *Temnopteryx*, and not since shown to belong to other genera, demonstrates that with the following exceptions all are known or are stated to have spination of "Type B" on the ventro-cephalic margin of the cephalic femora. The exceptions are *guatemalæ* and *snodgrassi*, which are said to have the distal half of the margin unarmed; nothing is stated concerning the armament in *lobipennis*, *dimorpha* or *castanea*, and *brevipennis* is said to have "Type A."

As "Type A" is that found in the genotype of *Temnopteryx*, it seems evident that those said or known to have "Type B," and those with the margin unarmed distad, will be found to belong to other genera. This appears to be true of *brevipennis* as well, but in that case is due to the presence of other features which we need not discuss here.

When compared with the genus *Symploce* (as represented by its genotype *S. capitata*), the present genus can be distinguished by having the tegmina reduced in size in both sexes, virtual absence of venation of same, interocular space broader than interocellar space in both sexes, and the lack of evident specialization of the distal abdominal tergites in the male. From *Temnopteryx* (as represented by its genotype *T. phalerata*), *Nesomylacris* can readily be distinguished by the elongate, narrow, non-deplanate head, less distinctly veined tegmina (which in *Temnopteryx* show a clearly defined and normally shaped and sized anal field), articulate though reduced and functionless wings, and very elongate, slender and hardly compressed tarsi (as compared with robust, relatively short and strongly compressed tarsi in *Temnopteryx*).

It appears to us that *Nesomylacris* represents a specialized offshoot of the symplocoid stock, much as *Nelipophygus* does of the ischnopteroid phylum.

GENERIC CHARACTERS.—Head pyriform, hardly depressed; interocular space broad, broader than that between ocellar spots. Pronotum arcuate in transverse section, lateral portions decidedly declivent. Tegmina abbreviate, quadrate or subtrigonal, corneous; venation poorly indicated. Wings greatly reduced, lateral, lobiform, but articulate. Abdominal segments unspecialized except for genital plates. Subgenital plate of male asymmetrical. Cephalic femora with ventro-cephalic margin armed with regular uniseriate spines ("Type A"), distal group on same margin made up of two larger spines. Tarsi proportionately slender and elongate; caudal tarsi subcylindrical, metatarsus as long as or longer than remaining tarsal joints, ventral surface of metatarsus biseriate spinulose; tarsal joints provided with apical pulvilli. Arolia present. Tarsal claws equal, margins simple.

GENOTYPE.—*N. relica*, new species.

KEY TO SPECIES

Tegmina attingent, subtrigonal in shape, covering but a portion of the lateral, lobiform wings. Cerci in large part tapering and moniliform. Sinistral style of male subgenital plate spiniform, subfalciform, surface unarmed; dextral style represented by mere knob. (Cuba.) . . . . *cubensis*, new species.

Tegmina attingent, quadrate, completely covering the lateral lobiform wings in both sexes. Cerci of male broader and fusiform. Sinistral style of male subgenital plate elongate, acuminate, its surface covered with recurved, shagreenous spicules; dextral style not evident. (Jamaica.) . . . . *relica*, new species.

Nesomylacris cubensis, new species

Plates X, Figures 11–13; XI, Figure 1

Type.—Male; twelve and one-half kilometers south of Pinar del Rio, Pinar del Rio Province, Cuba. September 12–23, 1913. (Lutz; in dry region of pines and palmettos.) [American Museum of Natural History.]

Size small; form elliptical, tegmina abbreviate, wings lobiform, exposed; surfaces polished, less decidedly so on dorsum of abdomen.

Head very narrowly visible cephalad of pronotum when seen from dorsum, general form of head pyriform, regularly narrowing toward buccal region, occipital and ocular outline regularly arcuate. Interspace between eyes broad, equal to one and one-third of the occipital depth of eyes; ocellar spots elliptical, set obliquely, faintly less distant than eyes; antennal bases slightly more widely separated than eyes; face moderately deplanate in profile. Palpi with fourth joint slightly shorter than third joint, rather strongly infundibuliform, distal margin slightly oblique truncate; fifth joint slightly longer than third joint, moderately inflated, ventral margin arcuate proximad, dorsal margin faintly concave, the joint bluntly acuminate distad. Eyes not prominent, in basal outline strongly reniform, very broad toward occiput, strongly narrowing toward mouth. Antennæ with proximal joint moderately enlarged.

Pronotum in outline semi-orbicular, in dorsal view regularly arcuate, when examined in detail the cephalic margin is subtruncate, the latero-cephalic angles well rounded, caudal margin subtruncate, caudo-lateral angles rounded, all margins cingulate; surface of pronotum without impressions; in section moderately arcuate, latero-cephalic angles moderately decurved.

Tegmina chitinous, broad, subtrigonal, greatly abbreviate, the apex, which is costal, not reaching to the distal margin of the metanotum, narrowly attingent mesad, greatest width considerably greater than length; costal margin faintly arcuate, apex broadly rounded, distal margin obliquely concavo-truncate, disto-sutural angle and sutural margin regularly and continuously arcuate; venation hardly indicated, such as is apparent is tracheiform; no defined marginal or anal fields. Wings lateral, lobiform, articulate pads, reaching almost to the distal margin of the median segment, a considerable portion not covered by the tegmina.

Mesonotum and metanotum each with a very broad lappet-like chitinous projection caudad, which is continuous with the structure and character of the mesonotum, not reaching the bases of the wing pads, truncate distad, rectangulate disto-laterad; of the metanotum extending across from under the wings, the margin narrowly rounded laterad, nearly straight on the distal margin except for a faint and very broad median angulation.

Abdomen deplanate dorsad; tergites exclusive of ultimate one, cingulate laterad, disto-lateral angles moderately produced acute, exclusive of ultimate tergite, which has them broadly rounded; distal margin of proximal tergite truncate, thence these margins are gently arcuate concave to the ultimate one which is more strongly arcuato-concave. Supra-anal plate moderately transverse, the distal margin rounded bilobate, the median emargination broadly obtuse-angulate. Cerci relatively long, composed of eleven segments, tapering from the third segment, decidedly moniliform thence distad, apex attenuate but not acute. Subgenital plate asymmetrical, of medium size; margin arcuate sinistrad, greatest distal extent of plate appreciably sinistrad of median line, dextral portion of margin broadly and obliquely arcuato-emarginate; sinistral style spiniform, subfalciform; dextral style represented by a mere knob at the distal end of the dextral emargination; distal extremity of plate with surface transversely impressed.

Limbs moderately robust, coxæ and femora markedly, tibiæ moderately, compressed. Cephalic femora with ventro-cephalic margin with a regular series of "Type A" spines, these relatively stout, decreasing in length and intervals distad from proximal fourth, apical spine with distal one appreciably the longer; ventro-caudal margin with five spaced spines, none in proximal two-fifths. Median and caudal femora with ventral margins well spined. Tarsi with well-marked apical pulvilli on the four proximal segments, metatarsi and succeeding joint biseriate spinulose ventrad; caudal metatarsus slightly longer than the succeeding joints united.[1]

General coloration of head, pronotum, tegmina, meso- and metanotum and median segment mars orange, with well-defined lateral edgings of buff-yellow to mustard yellow on pronotum and tegmina, these relatively broad, narrowing cephalad, not sharply defined from the general coloration of those parts. Dorsal surface of abdomen blackish brown, the proximal tergites mesad occasionally (type) showing traces of mars orange; broad, subequal lateral bars of the same bordering color as found on the pronotum indicated on all the abdominal tergites, the penultimate one in addition with its distal margin rather broadly margined with the same, this making a transverse connecting bar of that color; distal margin of the other tergites occasionally (paratype) weakly and narrowly pencilled with buckthorn brown. Supra-anal plate and cerci of the general dorsal abdominal color, the former narrowly edged distad with yellowish, and the latter faintly pointed along their median line with buckthorn brown. General coloration of head, ventral thoracic segments, coxæ and limbs and lateral borders of abdominal sternites between ochraceous-buff and ochraceous-orange; disk of ventral surface of abdomen and subgenital plate blackish chestnut-brown; median and caudal coxæ each with a blackish chestnut-brown spot proximad, larger on the caudal pair, occasionally (paratype) this suffusing much of the adjacent coxal surface. Occiput occasionally (type) clear ochraceous-orange; eyes mottled mummy brown and blackish brown, antennæ progressively suffusing with bister distad.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen[2]	Greatest Width of Tegmen
♂, type	9.7	3.3	4.5	2.5	2.7 mm.
♂, paratype	8.3	3.2	4.4	2.6	2.8

In addition to the type we have before us a paratypic male, measured above, bearing the same data as the type except that it was taken by Leng. The paratype shows no noteworthy differences from the type.

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[1] The type has one caudal tarsus four-jointed, the others five-jointed.
[2] Greatest visible length along the coastal margin.

Nesomylacris relica, new species

Plate XI, Figures 2 to 5

When compared with *N. cubensis*, the Jamaican *relica* can be distinguished immediately by the attingent, quadrate tegmina, which completely cover the lateral, lobiform wings, while the cerci are broader and fusiform, the ultimate tergite is straight transverse distad and the structure of the male subgenital plate and development of the styles is different.

Type.—Male; Stony Hill, St. Andrew Parish, Jamaica. October 25, 1913. (Morgan Hebard; among dead leaves in heavy leaf mould under dense hillside scrub.) [Hebard Collection, Type No. 482.]

Size small; form elliptical; tegmina abbreviate, quadrate; wings lobiform, covered; surface polished.

Head very narrowly visible cephalad of pronotum when seen from dorsum. General form of head short and broad pyriform, the greatest width across eyes subequal to depth of head; occiput moderately arcuate, eyes widely separated, the interspace little less than twice occipital depth of eye; ocellar spots of medium size, ovate, sharply contrasted in coloration, very faintly more approximate than eyes; antennal scrobes equidistant with eyes in their separation; face subdeplanate longitudinally, moderately arcuate transversely. Palpi short, yet relatively large and heavy; third joint deeper than usual, subcompressed, weakly arcuate proximad; fourth joint about three-quarters of length of third joint, strongly infundibuliform, distal margin laterad obliquely truncate; fifth (distal) joint subequal in length to the third joint when seen from dorsum, strongly inflated on external side, when seen from dorsum elliptical in outline, apex faintly rectangulate, in profile subdepressed with ventral margin arcuato-truncate. Eyes not prominent, strongly reniform in basal outline, broad cephalad, moderately narrowed ventrad. Antennæ with proximal joint moderately enlarged.

Pronotum as described under *N. cubensis*.

Tegmina corneous, quadrate, reaching to the base of the proximal tergite, attingent and narrowly overlapping at sutural margins; costal margin weakly arcuate, disto-costal angle broadly rounded rectangulate, distal margin truncate with a faint arcuate emargination, disto-sutural angle narrowly rounded rectangulate, sutural margin straight. Marginal field imperfectly defined, anal field not indicated; venation obsolete, not indicated except by a tracheiform development of humeral trunk. Wings lobiform lateral articulate pads, not reaching caudad of the margin of the metanotum, completely covered by the tegmina.

Mesonotum[1] with its margin in general form broadly arcuate, a weak and narrow marginal integument developed into a median angulate point and a pair of lateral obtuse angulations. Metanotum with the marginal integument more developed, similar to that in *N. cubensis*. Median segment with margin arcuate.

Abdomen deplanate dorsad; tergites with lateral margins cingulate, less distinctly so on ultimate tergite, disto-lateral angles slightly acute on all except ultimate exposed tergite, there they are subrectangulate; tergites with distal margin as follows;

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[1] The characters of the mesonotum and metanotum taken from paratypes, as we do not desire to damage the type to see these structures.

sinuate weak arcuate on proximal tergite, more nearly truncate on second one, weakly arcuate emarginate thence to ultimate exposed tergite, which has the margin truncate. Supra-anal plate as in *N. cubensis*, but less distinctly bilobate. Cerci relatively short, stout, fusiform, composed of nine segments, tapering in distal two-fifths, there moniliform, apex subacute. Subgenital plate slightly asymmetrical, of medium size; margin as seen from venter weakly arcuate convergent on sinistral side, with a shallow but evident cercal emargination; apex mesad, obtuse-angulate, dextral portion of margin in general arcuate with no cercal emargination; from dorsum the plate is seen to have mesad an internal accessory shelf, which bears the sinistral style: sinistral style slender, elongate, acuminate, its surface covered with recurved, shagreenous spicules, like a dentist's broach, to which it bears a very great resemblance; dextral style not evident.

Limbs in general much as in *N. cubensis*, except as follows: ventro-caudal margin of cephalic femora with four spaced spines, none in proximal two-fifths, Caudal metatarsus appreciably longer than the succeeding joints united.

Allotype.—Female; same data as type. [Hebard Collection.]

Differing from the description of the type in the following features.

Ocellar spots proportionately smaller than in male. Palpi with fifth joint less inflated laterad than in male.

Abdominal tergites with disto-lateral angles less produced than in male, more rectangulate, becoming obtuse on penultimate exposed tergite, strongly obtuse on ultimate exposed one; distal margin of tergites as in male on proximal one, thence truncate to the ultimate tergite, which has it weakly arcuate mesad. Supra-anal plate broad trigonal, slightly transverse; distal margin narrowly and shallowly bilobate mesad; surface concavely depressed laterad. Cerci as in male but proportionately more robust, less attenuate distad, non-moniliform. Subgenital plate broad transverse; distal margin with lateral sections converging to cercal emarginations, which are moderately pronounced and arcuate; median section of the margin, between cercal emarginations, broadly arcuate, weakly flattened and also very faintly and shallowly arcuate-emarginate mesad.

Surface of the disk of the pronotum, dorsal surface of abdomen and discoidal and anal fields of tegmina ranging from chestnut, through deep maroon, to blackish brown; indefinite narrow lateral marginal section of pronotum, costal region of tegmina and occasionally lateral marginal series of spots on the dorsum of the abdomen ranging from primuline yellow to ochraceous-orange. Disk of pronotum rarely with subobsolete traces of a paler medio-longitudinal line. Abdomen occasionally with lateral series of yellow spots, infrequently weak and reduced in size, little contrasted (allotype), when present generally forming a nearly continuous margin laterad, in the recessively colored specimens connected by a transverse bar caudad on the ultimate tergite, entirely absent in a number of the series; supra-anal plate unicolorous, or mesad or mesad and marginally with yellowish. Head uniformly of the color of the disk of the pronotum; eyes fuscous to blackish. Limbs ranging from ochraceous orange through zinc orange to clay color, the coxæ occasionally paling to antimony yellow, the median and caudal coxæ broadly, and the cephalic coxæ very narrowly, of the dark dorsal color proximad. Palpi and mouth-parts warm buff to antimony yellow; two distal palpal joints occasionally suffused with dark color; antennæ of the palpal color, suffused distad to a variable extent with bister, rarely showing suffusion to and involving the proximal segment. Ventral surface of abdomen of dark dorsal color. Cerci above of the pale abdominal marginal color, occasionally suffused with the dark color proximad or as on ventral surface; ventral surface with segments individually blackish brown, edged distad with pale yellowish. The immature specimens have the meso- and metanotum edged laterad with the pale bordering color.

MEASUREMENTS

	Length of of Body	Length of Pronotum	Greatest Width of Pronotum
♂, Stony Hill, Jamaica, type	9.4	3.2	4.5mm.
♂, Stony Hill, Jamaica, paratype	8.9	3	4.2
♂, Stony Hill, Jamaica, paratype	9.5	3	4.4
♀, Stony Hill, Jamaica, allotype	12.3	4.2	6
♀, Stony Hill, Jamaica, paratype	11.4	3.9	5.4
♀, Montego Bay, Jamaica, paratype	10.3	3.5	5.2
♀, Montego Bay, Jamaica, paratype	11.4	3.4	4.8

	Length of Tegmen	Greatest Width of Tegmen	Width of Abdomen
♂, Stony Hill, Jamaica, type	3	2.9	4.6mm.
♂, Stony Hill, Jamaica, paratype	2.8	2.7	4.5
♂, Stony Hill, Jamaica, paratype	3.2	3	5
♀, Stony Hill, Jamaica, allotype	4.3	3.8	6.7
♀, Stony Hill, Jamaica, paratype	3.6	3.5	6.5
♀, Montego Bay, Jamaica, paratype	3.6	3.4	6.2
♀, Montego Bay, Jamaica, paratype	3.2	3.1	5.8

In addition to the type and allotype we have before us the following.

Same data as type, 5♂, 1♀, 1 immat. ♂, 4 immat. ♀, [Hebard Cln. and A. N. S. P.].

Pleasant Hill, Blue Mountains, Jamaica, elevation, 3660–3800 feet, July 21, 24 and 28, 1923, (Rehn; under stones and about bases of banana trees in ground litter), 4♂, 3♀, 3 immat. ♂, 2 immat. ♀, [A. N. S. P.].

Cinchona, Blue Mountains, Jamaica, elevation, 4900 feet, February 24, 1911, 1 immat. ♀.

Morces Gap, Blue Mountains, Jamaica, elevation, 4980 feet, July 29–30, 1923, (Rehn; in bromeliads), 1♂, 1 immat. ♀, [A. N. S. P.].

West slope of Sir John Peter Grant Peak, elevation, 5700 feet, July 26, 1923, (Rehn; under bark of tree in dense ridge type forest), 1♀, [A. N. S. P.].

Cumberland District, Clarendon Parish, Jamaica, elevation, about 3000 feet, December 15–18, 1919, (F. E. Watson), 1 ♀.

Mandeville, Manchester Parish, (Stewardson and Amos P. Brown), 1 ♀ (broken), [A. N. S. P.].

Montego Bay, St. James Parish, Jamaica November 3, 1913, (Hebard; from large dead agave growing in scrub forest), 3 ♀, 1 immat. ♀, [Hebard Cln.].

We consider paratypic all the adults above listed, with the exception of the broken Mandeville female.

We find no structural features of variation sufficiently important to note, except that numerous tarsi in the series possess but four joints. There appears to be no rule or order in the association of four joints with certain pairs of limbs.

As a whole the Blue Mountain series is more uniformly dark than those from the lower elevations, particularly in the coloration of the dorsal surface of the abdomen. In teneral individuals the tegmina appear distinctly lighter than in the fully hardened specimens.

It is evident that the present species is widely distributed within the island of Jamaica, occurring from the vicinity of sea-level to as high as fifty-seven hundred feet elevation, and under conditions as varied as in bromeliads in mountain cloud-drenched forest, in dead agave in scrub forest and under litter in stands of banana.

Apparently this insect occurs adult nearly or quite throughout the year.

EUPHYLLODROMIA Shelford

This tropical American genus comprises a considerable number of species, distributed from southern Mexico to Brazil, with the center of greatest differentiation in the Guianan and Amazonian regions. The genus represents a distinct genera group of the subfamily, certain of whose components are Old World types.

The genus *Nymphodromia*, described above, has more the character of an annectant link with the Blattellæ Group than anything previously known, but the exact relationship of the Pseudophyllodromiæ, in which we place *Euphyllodromia*, is still undetermined. When the Old World relatives are better understood we will be in a position to state more definitely the relationship of this genera group to the far larger assemblages called the Blattellæ and Ischnopteræ.

The species are all strikingly colored, highly polished forms, with the head and body markedly depressed and the venation distinctive. Two species have been described from the West Indies, neither of which are in the collections before us. It is evident both of these species reached the southern Lesser Antilles, where they are found, from South America. The two species may be distinguished by the following key, made from the original descriptions.

(Female sex alone known)

Head with pale line between eyes. Antennæ castaneous. Pronotal disk chestnut, with two longitudinal white lines; cephalic and caudal margins of pronotum marked with white. Tegmina castaneous, veins white. Abdomen and cerci ferruginous.......................................*albinervis* (Brunner).

Head with fuscous line between eyes. Antennæ black. Pronotal disk yellow, marked with two longitudinal lyrate black lines and a shorter median black line. Tegmina hyalino-testaceous, veins fuscous; tegmina beyond middle obliquely marked with fuscous. Abdomen and cerci fuscous......*semivitrea* (Brunner).

Euphyllodromia[1] **albinervis** (Brunner)

P[seudophyllodromia] albinervis Brunner, 1893, Proc. Zoöl. Soc. London, p. 602. ♀; Mount Gay Estate (leeward side), Grenada, West Indies.

This species has not been recorded since the original description.

Euphyllodromia semivitrea (Brunner)

P[seudophyllodromia] semivitrea Brunner, 1892, idem, p. 203, Pl. xv, fig. 2. ♀; St. Vincent (windward side), West Indies.

Like *E. albinervis* this species has not been recorded since the original description.

Blattinæ

We are placing the subfamily Blattinæ immediately after the Pseudomopinæ in linear arrangement of the family, as we are convinced the two groups are of sufficiently close relationship to be so placed, although the idea of combining them, as has been suggested, is felt to be unwise and unwarranted. On the other hand the separation of the two groups by the Nyctiborinæ and the Epilamprinæ, as is the method followed by most classifications, is becoming increasingly indefensible, particularly as our knowledge of the real affinity of the Epilamprinæ and the Panchlorinæ becomes more conclusive. At this writing it is only fair to say that we are open-minded regarding the proper sequence of the subfamilies of the Blattidæ and are endeavoring to devise a logical and, as far as possible, natural arrangement. The results so far achieved have been slight, chiefly because the number of genera to be considered and the diversity of structure encountered, combined with a variability in many features and the prevalence of sexual dimorphism, is so great. These factors make the recognition of group characters a matter of the utmost difficulty.

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[1] For discussion of this name as distinct from *Pseudophyllodromia*, see Hebard, 1920, Mem. Amer. Entom. Soc., No. 4, p. 82.

The sequence in which the West Indian genera of the Blattinæ are treated in this study represents our idea of their natural arrangement. The following key is a purely artificial one to enable the student to place his material generically.

KEY TO THE GENERA OF THE WEST INDIAN BLATTINÆ

1. Caudal metatarsus robust, relatively short, distinctly shorter than remaining tarsal joints, strongly compressed. Ventral surface of second and third joints of caudal tarsi unspined; ventral of caudal metatarsus spined...2.

   Caudal metatarsus slender, elongate, not distinctly shorter than remaining tarsal joints. Ventral surface of second and third joints of caudal tarsi bearing spinulations similar to those of ventral surface of caudal metatarsus. (Tegmina fully developed to lateral and lobiform.).....................3.

2. Tegmina truncate, but obliquely so, with distal angle at sutural margin the more produced (little evident in *P. occidentalis*), or fully developed, never lateral trigonal pads. (All are chiefly dark species with dorsal surface including tegmina polished and frequently showing a purplish sheen.) *Pelmatosilpha* Dohrn.

   Tegmina transverse truncate, or more decidedly reduced and lateral. (Dark species have dorsal surface of body and tegmina roughened, a number of species of pale base coloration have strikingly different dark patterns.) *Eurycotis* Stål.

3. Arolia absent. (Size medium. Tegmina and wings of male covering about two-thirds of abdomen, truncate distad; tegmina of female lateral trigonal pads, not attingent mesad; wings absent in female. General coloration shining blackish chestnut-brown (♂) or blackish brown (♀). Dorsal surface of male abdomen unspecialized. Supra-anal plate of male transverse subrectangulate.)..*Blatta* Linnæus.

   Arolia present...4.

4. Tegmina lateral, sublanceolate; wings absent. Caudal tarsus extremely slender. Caudal metatarsus four-fifths as long as caudal tibia. Pulvilli present solely on fourth joint of all tarsi. Supra-anal plate of female transverse, distal margin weakly arcuate, not emarginate............*Henicotyle*, new genus.

   Tegmina and wings fully developed. Caudal tarsus moderately slender. Caudal metatarsus about one-half as long as caudal tibia. Pulvilli present on four proximal tarsal joints. Supra-anal plate of female rostrate, emarginate mesad...*Periplaneta* Burmeister.

PELMATOSILPHA Dohrn

Pelmatosilpha DOHRN, 1887, Entom. Zeitung Stettin, XLVIII, p. 410.

GENOTYPE (indicated by Kirby, 1904).—*P. alaris* (Saussure).

The exact relationship of the present genus to *Eurycotis* is still uncertain, and efforts to find characters to consistently separate species, which on general appearance would be placed in one or the other genus, have been rewarded with but temporary success. That *Pelmatosilpha* is extremely close to *Eurycotis* is evident to any one who has given them any study, yet at the same time the two groups seem to be sufficiently distinguishable to the trained eye. As represented by the genotypes the two genera are quite distinct, and as far as the West Indian forms are concerned little difficulty is likely to be encountered in referring species to one or the other group, except in the case of *P. occidentalis* which has subquadrate tegmina. The South American species, however, greatly complicate the situation, and until we have a better understanding of them the exact relationship of the genera cannot be convincingly determined. We feel the most satisfactory arrangement at the present time would be to permit both groups to stand as generic entities, if necessary rearranging the species in conformity with what appears to be their proper position in relation to the respective genotypes. If the future shows such an arrangement produces a completely intergrading series of species, no other course will be open but to synonymize the name *Pelmatosilpha* under *Eurycotis*.

In the West Indies *Pelmatosilpha* occurs only in the Lesser Antilles and the easternmost of the Greater Antilles, to the westward its place being taken, apparently, by various species of *Eurycotis*, which latter genus in the Lesser Antilles is definitely known only from Antigua and possibly St. Barthelomew. The present genus is elsewhere of South and Central American distribution, one record from Texas being in all probability of an adventive individual.

KEY TO WEST INDIAN SPECIES OF *Pelmatosilpha*

This table is based solely on the more evident features of the species and to that extent it is superficial, as we possess but a single imperfect specimen of one of the forms (*marginalis*). The sequence of the specific treatments represents our idea of the linear arrangement of the species.

1. General coloration dark with broad lateral yellow pronotal bands. Coxæ pale. . 2.
General coloration uniformly dark, no yellow pronotal bands. Coxæ dark, of the general color. (Tegmina very deep maroon.) [Martinique and St. Lucia.] *occidentalis* (Saussure).
2. Lateral yellow pronotal bands continued upon the tegmina, occupying virtually all of their marginal field. . . . . 3.

Lateral yellow pronotal bands not continued upon the tegmina. (Tibiæ solidly blackish brown, femoral apices similarly colored; remainder of femora pale.) [Grenada.].......................................*marginalis* Brunner.

3. Size smaller. Caudal tibiæ robust, seen from dorsum subfusiform in male sex. Subgenital plate of male with distal margin arcuate. [Porto Rico.] *coriacea* Rehn.

Size larger. Caudal tibiæ more slender, seen from dorsum not fusiform in male sex. Subgenital plate of male with distal margin truncato-concave. [Antigua, Montserrat and Dominica.]..................*purpurascens* (Kirby).

Pelmatosilpha coriacea Rehn

Plate XI, Figures 6 to 11

Pelmatosilpha coriacea Rehn, 1903, Trans. Amer. Entom. Soc., XXIX, p. 278. ♀; El Yunque, 800 feet elevation, Porto Rico.

Porto Rico.—Adjuntas, Department of Aguadilla, VI, 8–13, 1915, 1♀. Baños de Coamo, Department of Ponce, XI, 1899, (in *Tillandsia*), 1♂, [A. N. S. P.].

Mona Island.—Playa Sardinera, II, 24, 1914, (F. E. Lutz), 1♂.

As the genitalic features of the male sex have not been described a few notes on these are desirable.[1]

Supra-anal plate transverse subrectangulate, its length contained nearly twice in proximal width; lateral margins subsigmoid convergent distad, the distal width approximately one-half of proximal width, lateral margins regularly rounding into the broadly bilobate distal margin, which is very shallowly V-emarginate mesad; surface of plate with lateral subparallel depressions, mesad very faintly arcuate in transverse section; distal margin distinctly and lateral margins more sparsely supplied with subchætiform hairs. Cerci surpassing distal margin of supra-anal plate by one-half of their length, broad fusiform, depressed, dorsal surface flattened, composed of about ten apparent segments, apex moderately acute; margins of cercal segments as seen from dorsum with sparse, elongate chætiform hairs and more numerous shorter hairs. Subgenital plate transverse, between insertions of the styles the distal margin of plate is broadly arcuate; styles elongate, nearly one-half as long as cerci, tapering, slender distad, faintly incurved in proximal third. Dextral concealed process broad and lamellate proximad, distad abruptly developed into a slender but flattened, very open spiral, subulate probe, the apex of which is aciculate. Sinistral concealed process elongate, arcuate, subdepressed, with its head blunted and developed on the internal side into a recurved, uncinate projection (Fig. 9).

These specimens show that in this genus length and exact form of the tegmina may be subject to intra-specific variation. The two males have subquadrate tegmina, but little longer than the pronotal disk, their distal margins subtruncate, nearly transverse. The female has more elongate, sublanceolate tegmina, which have their greatest length on the sutural side, where they are one and one-half times as long as the

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[1] From Baños de Coamo specimen.

pronotal disk, the costal and distal margins continuously and regularly arcuate to the narrowly rounded disto-sutural apex. Whether this is really a sexual difference, or an individual one, we cannot determine from the small series available, but it is evident that the differences are not specific features. In the males the dorsum of the abdomen bears semicircular pale markings laterad on each segment, in the usual position of such markings in this and related genera; in the female these dorsal markings are subobsolete (proximad) to obsolete (distad). On the ventral surface similar markings are indicated in both sexes. The coxæ are proximad infuscate to a variable degree, while the femora vary from deeply rufescent to ochraceous.

The caudal tibiæ of the male are appreciably more expanded in proportion to their length than in the female sex.

This species is apparently limited in its distribution to Porto Rico and Mona Island.

Pelmatosilpha purpurascens (Kirby)

Plates XI, Figures 12 and 13; XII, Figures 1 and 2

Periplaneta purpurascens Kirby, 1903, Ann. and Mag. Nat. Hist., (7) XII, p. 375. Sex?; Dominica.

Dominica.—Fore Hunt Flat, elevation 1350 feet, VI, 27, 1911, (Miner; in decaying logs in forest), 1 ♂. Long Ditton, VI, 17–20, 1921, (Lutz; taken with light at night), 3 ♂, 1 ♀, 2 immature ♂, 1 immature ♀, 2 small immature individuals. Laudet, VI, 11, 1911, (Lutz), 1 immature ♀.

Montserrat.—Plymouth, III, 1894, (C. V. Riley), 1 immature ♂, [U. S. N. M.].

Antigua.—No exact locality, II, 10, 1913, (P. G. Russell), 1 immature ♀, [U. S. N. M.].

This species is closely related to *P. coriacea*, but is a distinctly larger form, with more elongate and proportionately less robust limbs, the caudal tibiæ being more subequal in width in distal two-thirds and less fusiform than in *P. coriacea*, particularly in the male sex; also with truncato-concave instead of arcuate distal margin of the male subgenital plate and distinctive features of the concealed genitalia of the male. The male genital features not having been described it appears desirable to give those of diagnostic importance.[1]

Supra-anal plate with its general form very much as in *P. coriacea*, but proportionately somewhat broader distad, and with rounding of lateral into distal margins more evident, while the distal margin is broadly subarcuate emarginate; surface of plate weakly tectate mesad. Cerci similar to those of *coriacea* but faintly shorter and appreciably more slender. Subgenital plate strongly transverse, stylar pockets deeply arcuate emarginate, distal margin broadly truncato-concave: styles similar to those of *coriacea* but slightly coarser and virtually straight. Dextral concealed process broad and lamellate proximad, passing more regularly than in *coriacea* into an elongate, nearly straight aciculation, which is directed meso-dorsad. Sinistral concealed process straight, the apex recurved, narrowed, then expanded into a truncate head, which is narrowly rounded distad, and acute but not spiniform proximad.

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[1] From male labelled "Long Ditton, June 17, 1911."

The adults of the present series are approximately uniform in their tegminal development, but Shelford's figure of the species,[1] presumably taken from the type, which is probably a female although not specified as such by Kirby, shows that the same tegminal variation noticed above under *coriacea* occurs in this species. In all the adults the pale lateral bars are strongly marked from cephalic margin of pronotum to the disto-costal portion of the tegmina. Pale markings laterad on the abdominal segments occasionally are weakly indicated proximad on both dorsal and ventral surfaces, but these are generally absent. The immature individuals represent three instars, and in all but two Dominican specimens in the two instars preceding maturity are the pale lateral areas indicated with greater or lesser distinctness. The Antigua immature shows that the disk of the thoracic segments may be pale to a variable degree, making the dark areas broad reversed V-shaped on the pronotum and lateral, caudad connected, bars on the meso- and metathorax.

The known range of this species is seen to be limited to the northern section of the Lesser Antilles. The localities given above are all known for the species.

Pelmatosilpha marginalis Brunner

P[elmatosilpha] marginalis Brunner, 1893, Proc. Zoöl. Soc. London, p. 603, Pl. lii, fig. 2. ♂; Balthazar, Grenada.

Grenada.—No exact locality, (Mrs. W. E. Broadway), 1 specimen without abdomen, [Hebard Cln.].

This imperfect specimen shows that the pale lateral markings do not broadly reach the caudal margin of the pronotum, as in the two species treated above, but are separated by a narrow area of the dark discal color, while the lack of pale color on the costal portion of the tegmina is a very evident, though possibly variable, feature. The outline is less truncate caudad than in the other species, but this may prove to be purely individual. The tibiæ, tarsi and distal sections of the femora are strongly infuscate, except the base of the distal tarsal joint, which is ochraceous, similar to the greater portion of the femora. The penultimate palpal joint is also infuscate, sharply contrasted with the remaining ochraceous portions of the palpi.

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[1] 1910, 'Gen. Insect.,' fasc. 109, Blattidæ, Blattinæ, Pl. ii, fig. 15.

Pelmatosilpha occidentalis (Saussure)

Plate XII, Figures 3 to 5

Peripl[aneta] occidentalis Saussure, 1864, Rev. at Mag. de Zool., (2) XVI, p. 318. ♀; Antilles.[1]

Martinique.—St. Pierre, 1902, (J. Waddy), 1♂, 1♀, [Hebard Collection].

St. Lucia.—Castries, IX, 10–22, 1919. (J. C. Bradley), 1 immature ♂, [Cornell Univ.]. Union, near Castries, IX, 17, 1919, (J. C. Bradley), 1♂, 1 immature ♂, [Cornell Univ.].

This species is uniformly colored and recognizable at once, when compared with the other West Indian members of the genus, by its lack of marked color contrast, the dorsal tone being uniform blackish to very deep maroon, with the tegmina hardly contrasted with the general coloration. Our previous knowledge of the species consists solely of the original description, which is quite brief and based on the female sex, and another, more complete, yet unsatisfactory description by the original author.[2] Bolivar[3] and Gundlach[4] have recorded the insect from Cuba, but the material examined by both of them, as shown by Gundlach's comments and comparison with the original description, clearly did not represent this species, probably being one of the immature stages of some one of the species of *Eurycotis* recorded by us from the Guantanamo region of Cuba.

It is very possible *occidentalis* is restricted in distribution to the islands of Martinique and St. Lucia. The Lesser Antilles to the north are inhabited, at least in part, by the related *P. purpurascens*, while to the south, in Grenada, occurs *P. marginalis*. What form or forms, if any, of this genus occur in St. Vincent and Barbados is at present unknown.

In features other than coloration *occidentalis* differs markedly from *coriacea* and *purpurascens*, in both sexes in the shape of the supra-anal plate, which is more truly trigonal, and in the much blunter cercal apices, while the more quadrate tegmina are equally diagnostic, of more decided character in the female than in the male. From *P. marginalis* Brunner, from Grenada, the present species is distinguishable by the subquadrate tegmina, as well as the absence of lateral yellow bars on the pronotum. Our material of *marginalis* does not permit us to speak of genitalic features as it lacks the abdomen.

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[1] In a contemporaneous and more complete description (1864, Mém. Hist. Nat. Mexiq., IV, p. 74) Saussure gives "Martinique" as the locality.

[2] 1864, 'Mém. Hist. Nat. Mexiq.,' IV, p. 74.

[3] 1888, Mém. Soc. Zool. France, I, p. 126. [Cuba.]

[4] 1890, 'Contr. Entom. Cubana,' IV, p. 306. [Monte Toro, Guantanamo, Cuba.]

The previous descriptions of this species are so imperfect it seems advisable to give a summary of the ambisexual characters, and also of the genital features of both sexes, the male having been unknown previously. These characters have been drawn chiefly from the St. Pierre pair.

Male.—Form as usual in this genus; surface smooth, polished, abdomen faintly and sparsely punctate, tegmina finely cribroso-punctate.

Head almost completely hidden under pronotum, as usual in genus very broad, greatest width across eyes subequal to greatest depth of head; occiput broadly arcuate, occipital interspace between eyes very great, equal to one-half entire width of head.

Pronotum of type usual in genus, greatest length contained one and one-third times in greatest caudal width; cephalic margin subtruncate dorsad of head, passing into diverging, moderately arcuate lateral margins; caudo-lateral angles rounded rectangulate; caudal margin subtruncate with an extremely faint median angulation; all margins cingulate, narrowly so caudad; in transverse section pronotum is strongly and regularly arcuate. Tegmina abbreviate, subquadrate, no longer than pronotum: costal margin weakly arcuate, narrowly rounding into the weakly oblique and subtruncate distal margin; disto-sutural angle narrowly rounded rectangulate; sutural margins nearly straight, narrowly overlapping: no clearly and continuously defined venation indicated, but anal sulcus well marked distad, where it reaches sutural margin at one-fifth its length from disto-sutural angle; humeral trunk weakly indicated; venation of discoidal and anal fields evident solely by the disposition of punctures; marginal field not reflexed or deplanate. Wings rudimentary, completely hidden under tegmina.

Abdomen broad subfusiform, moderately deplanate. Supra-anal plate proximad transverse, mesad subtrigonally produced, apex of projection markedly and rather deeply V-emarginate, forming a bilobate extremity; produced section of plate weakly tectate in section. Cerci subequal to median length of supra-anal plate, dorsad deplanate, apex bluntly acuminate. Subgenital plate transverse, interstylar portion of margin arcuato-truncate; styles nearly as long as median section of plate, equal, tapering, faintly incurved. Sinistral concealed genital process with apex curved at right angle to shaft and head expanded and flattened into a process with two acute angles, the distal much more prominent and acute, the proximal less acute, margin between obtuse-angulate emarginate (Plate XII, fig. 5). Character of dextral concealed genital process not clearly evident in the single male before us.

Limbs robust, caudal tibiæ moderately inflated (see comment below), extensor surface of latter deeply grooved at spine bases. Caudal metatarsi slightly shorter than remaining tarsal joints combined.

Female.—Differing from the above description of male in the following features. Supra-anal plate, as a whole, more trigonal and less transverse proximad; distal emargination deeper, broad, more sharply V-emarginate, the bilobations more angulate. Cerci slightly blunter distad than in male.

General color of head, pronotum and abdomen, shining black to very deep maroon, the blackish individuals showing faint areas of maroon to claret brown at the cercal bases, margins of supra-anal plate and rarely on median line of pronotum. Tegmina dark maroon, darker suturad. Head with eyes bister; ocellar spots, facio-clypeal suture and distal palpal joints orange to xanthine orange; antennæ chestnut, paling to orange-rufous distad. Cerci very narrowly tipped with orange-rufous. Limbs maroon to deep chestnut, the caudal tibiæ, and to some extent the cephalic and median pairs, and distal extremities of all the femora blackish; tarsi similar in color to tibiæ, but with distal portion orange-rufous, on the caudal tarsi limited to distal joint, claws and arolia, on median and cephalic tarsi less sharply contrasted and more extensive, passing into general color proximad.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen
♂, St. Pierre, Martinique..........	22.2	6.8	9.1	6.5
♂, Union, St. Lucia...............	18.5	6.5	8.4	5.7
♀, St. Pierre, Martinique..........	23.2	7.3	9.5	6.3

	Greatest Width of Tegmen	Greatest Width of Abdomen	Length of Caudal Tibia
♂, St. Pierre, Martinique....................	6.5	10.6	7.2 mm.
♂, Union, St. Lucia.........................	5.6	9.6	6.9
♀, St. Pierre, Martinique....................	6.6	11.3	8

Whether the smaller size of the St. Lucia male is geographic or individual in character remains to be determined. This specimen, however, shows one noteworthy feature of difference from the Martinique male. The caudal tibiæ are appreciably more inflated in the Martinique male than in the St. Lucia one, the latter in this respect having the tendency even less developed than in the Martinique female. The St. Lucia immature males, which represent two instars, however, have these parts somewhat more inflated than in the adult from the same island. Considering the fixity of this feature in the related genus *Eurycotis*, variability in *Pelmatosilpha* is puzzling, but it is quite possible that the adult specimen from St. Lucia may be depauperate, as witness its size, and that, as is true of certain Orthoptera, undersized specimens do not develop the more marked condition of features of this type.

This species in general appearance closely resembles the South American species *P. cothurnaria* (Giglio-Tos) and *micra* Hebard, having much the same type of coloration and tegmina approximating theirs in shape. *Cothurnaria* is readily distinguishable by the squarely truncate distal extremity of the tegmina and the undivided male supra-anal plate, as well as the complete and non-emarginate median portion of the margin of the subgenital plate of the same sex, and contrasted femoral and tibial coloration. The Colombian *micra*, however, is exceedingly close, but the cerci of *occidentalis* are blunter, the general size of the same is distinctly greater, and the supra-anal plate of the male is apparently different, as that of *micra* is presumably entire,[1] similar to *cothurnaria*.

EURYCOTIS Stål

Eurycotis STÅL, 1874, Bihang K. Svenska Vetensk.-Akad. Handl., (13) II, p. 13.
GENOTYPE (by monotypy).—*Polyzosteria rufovittata* Brunner.

The genus *Eurycotis* is one of the most puzzling assemblages to be found in the West Indian blattid fauna. It has given much trouble to workers in the past and we are by no means convinced that our present interpretation will not be subject to some future modifications. However, we feel certain that this, the first really serious effort to ascertain something of the true relationship of the West Indian forms of these interesting cockroaches, is logical and warranted by the evidence. The greatest difficulties in the past have been due to the failure of workers to distinguish between individually variable color features and specific color types in the genus, and also to the lack of recognition of immature material as such. The color feature difficulty, however, has been explained to a considerable degree by the authors in various papers treating of the North American *E. floridana*, which exhibits striking individual color variation, paralleled in the Cuban *E. opaca*. There is one interesting group of the genus, however, which exhibits remarkable color fixity within specific limits, although within the group there is much color diversity.

To better understand the generic tendencies it is well to state that *Eurycotis* in the West Indies is divisible into four groups, into which the forms described from other regions also may be assembled, but, due to a lack of available material, we do not feel qualified at this writing to speak with the same authority regarding the South and Central American species as we do of the West Indian forms. These four groups are: (1) species of glabrous or shining, almost impunctate surface, with tegmina lateral or quadrate, but not attingent, largely with variegated color pattern; (2) species of smooth surface, black body, highly specialized caudal tibiæ and lateral tegmina; (3) species of smooth surface, pale base color of head, thorax and tegmina, marked with dark, dark abdomen and quadrate and attingent tegmina; (4) species with coriaceous or corneous integument (with shining surfaces in immature individuals), with numerous punctulations and transverse, attingent or lateral tegmina. The first group comprises a number of West Indian species here treated. The second group is represented in the West Indies by *E. tibialis* of Hispaniola. The third group is a more generally South American one, represented in the West Indies solely by *E. similis* of Antigua. The fourth group comprises *E. opaca, taurus* and *E. cribrosa* of Cuba and the North American *E. floridana.* The two extremes of conditions in the genus as found in the West Indies are examplified by *E. lacernata* and *E. cribrosa,* the former depressed in form, with surface very much polished, impunctate, with a bold bicolored pattern, consisting of a solid median dark body color and nearly complete pale lateral bars; the latter much less depressed, with corneous, deeply punctate integument and solid black body color with contrasted tegmina.

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[1] The plate of the unique male of *micra* is asymmetrical and partially aborted, owing to lack of development or injury to the dextral portion of the margin. The margin is, however, of such character that we believe in normal condition it is entire, and not divided as in *occidentalis*.

The first group is the one which has required the greatest study and our more perplexing problems have been concerning the forms of which it is composed. We have found certain features to be useful in the separation of apparently closely related forms, features of the external and concealed genitalia, the inflation and shape of the caudal tibiæ and the character of the extensor surface of the same, as well as the extent of the caudal metatarsal pulvillus, all of which have not been referred to at all, or, in the case of the external genitalia, in a very casual way, in the past.

Before treating the species of the genus it seems desirable to speak of certain tendencies which are apparent in the genus, as evidenced by an examination of the rather closely related species of the first group mentioned above. The first one is of structure and can best be called a tendency toward quadration of the tegmina, in a group in which they are more normally lateral and sublanceolate or lobiform. This tendency is seen in group one in *torquinensis* and *caraibea.* The second feature is also one of structure and can be referred to as the caudal tibial inflation tendency, being a regular, subfusiform inflation of the article, when seen from the dorsal or ventral surface, sometimes accompanied by a flattening tendency. The difference is sharp and evident in species as closely related as *dimidiata* and *scalaris,* the former with distinctly inflated tibiæ, the latter with the more normal type. Evident inflation of the caudal tibiæ is found in all of the species of the group except *E. bahamensis, scalaris* and *caraibea.*

The other tendencies are all of coloration and are found combined to variable degrees in most of the species of the first group. They are of blocking, transverse lining and longitudinal paired barring characters. The blocking type is indicated in a solidly dark apex of the abdomen, which involves all of the supra-anal plate, forms without this having the supra-anal plate particolored. This blocking is evident in all the species of the group except *ferrum-equinum* and *galeoides*. The transverse dark lining is of the proximal and median dorsal abdominal segments and is indicated in all the species but *lacernata*, *bahamensis* and *caraibea*. The longitudinal paired dark barring ranges from one type where this tendency is indicated solely on the pronotum (*torquinensis*), to the other extreme where, apparently by a fusion of complete longitudinal bars, we have a solid dark mantle over most of the dorsum, as in *lacernata*. Intermediate stages in the development of the longitudinal pattern are indicated by the immature condition of *ferrum-equinum*, where the paired bars are fairly evident from the pronotum to the apex of the abdomen; the adult of the same species, where the paired bars on the pronotum fuse into a horse-shoe-shaped marking; and in *bahamensis*, where the solidity of the dorsal mantle is confined to the proximal abdominal segments. The tegmina are generally free of the markings, but are involved in *torquinensis*. Of the species of this group *galeiodes*, *dimidiata*, *scalaris* and *caraibea* do not have the longitudinal barring.

KEY TO THE WEST INDIAN SPECIES OF *Eurycotis*[1]

1. Caudal tibiæ without a distinct and decided, depressed expansion mesad, as seen from above..2.
   Caudal tibiæ with a distinct and decided, depressed expansion mesad. (Tegmina lateral.)..14.
2. Tegmina non-attingent, not transverse. Size smaller........................3.
   Tegmina attingent, transverse..12.
3. Surface nearly or quite impunctate. Color of body not solidly black, tegminal coloration not sharply contrasted with that of body..................4.
   Surface deeply, though rather sparsely, punctate. Color of body solidly black, tegminal coloration sharply contrasted with that of body. [Cuba.] *cribrosa*, new species.
4. Dorsum of body with a solid, broad, medio-longitudinal dark bar, apex of abdomen dark; broad, solid and continuous pale lateral marginal bars sharply contrasted. (Face with T-shaped dark marking. Caudal tibiæ subfusiform inflated, dark.) [Cuba.]........................*lacernata* Cabrera.
   Dorsum of body without a solid, medio-longitudinal dark bar, apex of abdomen dark or similar to proximal portion of abdomen; without broad, solid and continuous, sharply contrasted, pale lateral bars.........................5.

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[1] This key is largely artificial and is presented with full knowledge of its character.

5. Caudal metatarsi with pulvilli equalling two-thirds of metatarsal length. Abdomen dorsad with proximal tergites solidly dark mesad. Face with two transverse bars in addition to the interocular one. (Tegmina lateral.) [Bahamas.]..*bahamensis* Rehn.

Caudal metarsi with pulvilli equal to distinctly less than one-half length of metatarsus. Abdomen without solid dark color mesad on proximal tergites. Face without two transverse bars, or with a single medio-longitudinal dark marking (*torquinensis*)..6.

6. Face and occiput with a single, large, triangular dark marking, the base on the occiput, the apex ventro-caudad. Tegmina subquadrate, marked with dark pattern on sutural half. Pronotum with dark longitudinal pattern represented by a well-separated pair of lanceolate-reniform dark spots. [Cuba.]..*torquinensis*, new species.

Face and occiput without a large, triangular dark marking. Tegmina latera and lobiform, or sub-quadrate, never marked with the dark patternl Pronotum with dark marking, when present, in the form of a horse-shoe.[1]..7.

7. Pronotum with contrasted dark discal pattern. Caudal margin of pronotum. mesonotum and metanotum rather broadly bordered with blackish, (Tegmina lateral and lobiform.)..8..

Pronotum without contrasted dark discal pattern. Caudal margin of pronotum, mesonotum and metanotum very narrowly or subobsoletely bordered with blackish..9.

8. Caudal tibiæ infuscate. Proximal abdominal tergites with blackish distal marginal bars reaching the lateral margins of tergites; apex of abdomen solidly dark dorsad. Supra-anal plate of male solidly dark, its distal margin bilobate. [Cuba.]..*balteata* Cabrera.

Caudal tibiæ pale, not infuscate. Proximal abdominal tergites with blackish distal marginal bars not reaching to lateral margins of tergites; apex of abdomen not solidly dark dorsad. Supra-anal plate of male bicolored, its distal margin broadly subtruncate. [Cuba.] *ferrum-equinum*, new species.

9. Proximal abdominal tergites with dark margins. Tegmina lateral, lobiform, or weakly subquadrate (*galeodes*)..10.

Proximal abdominal tergites without dark margins. Tegmina subquadrate, slightly transverse, separated mesad by less than half the width of a single tegmen. (Caudal tibiæ not appreciably inflated; distal portion of same not infuscate. Supra-anal plate of male subtruncate distad, with a small, median, shallow V-emargination. [Cuba.]............*caraibea* (Bolivar).

10. Caudal tibiæ inflated. Proximal abdominal tergites with dark margins not broadly expanding laterad..11.

Caudal tibiæ not inflated. Proximal abdominal tergites with their dark margins not reaching the lateral margins, but laterad and intermarginally regularly and broadly widening, so as there to cover the entire length of segment. (Dorsal apex of abdomen solidly dark. Distal portion of caudal tibiæ distinctly but narrowly infuscate. Supra-anal plate of male bilobate distad.) [Cuba.]..*scalaris*, new species.

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[1] Very rarely this is narrowly divided, but never as distinctly as in *torquinensis*.

11. Dorsal apex of abdomen not solidly dark; supra-anal plate bicolored. Ventral surface of abdomen with broad, entire, usually imperfectly defined, pale lateral borders. Interocular bar rufescent. Caudal tibiæ proportionately longer, weakly yet distinctly inflated; distal portion of caudal tibiæ not heavily infuscate. (Tegmina weakly subquadrate.) [Cuba.] *galeoides*, new species.

Dorsal apex of abdomen solidly dark; supra-anal plate solidly dark. Ventral surface of abdomen solidly dark except for very narrow, pale lateral borders on the proximal sternites. Interocular bar blackish. Caudal tibiæ proportionately shorter, decidedly inflated; distal portion of caudal tibiæ heavily infuscate. [Cuba.] . . . . *dimidiata* (Bolivar).

12. Size large. Surface punctulate. Color solidly blackish fuscous, or with ochraceous lateral borders to thoracic segments and tegmina . . . . 13.

Size medium. Surface smooth, moderately polished, finely punctulate solely on tegmina. Head, pronotum, tegmina and thoracic segments with pale base color; face transversely dark barred, pronotum with fuscous horseshoe-shaped figure on disk. Abdomen fuscous, proximal tergites pale proximolaterad. [Antigua.] . . . . *similis* Caudell.

13. Form less robust in both sexes. Tegmina proportionately more abbreviate and transverse. Caudo-lateral angles of seventh abdominal tergite with spiniform production lacking marked internal lamellation. Supra-anal plate of male of type usual in genus. Caudal tibiæ relatively shorter. Pronotal, tegminal, and abdominal punctulations and sculpture less decided in male sex. [Cuba.] . . . . *opaca* (Brunner).

Form more robust in both sexes. Tegmina proportionately longer and less strongly transverse. Caudo-lateral angles of seventh abdominal tergite with spiniform production having an arcuate lamellation on internal face. Supra-anal plate of male transverse, with caudo-lateral angles produced laterad into recurved cornuiform spines, whole plate sharply upcurved distad. Caudal tibiæ relatively longer. Pronotal, tegminal, and abdominal punctulations and sculpture more decided, semi-shagreenous in male sex. [Cuba.] . . . . *taurus*, new species.

14. Color blackish or blackish fuscous, tegmina not contrasted. Size larger (body of female, 29 mm. long). [Hispaniola.] . . . . *tibialis* Hebard.

Color blackish, tegmina ochraceous with all of the margins narrowly blackish. Size smaller (body of female, 20.5 mm. long). [Cuba.] *avipennis* Saussure and Zehntner.

In addition to the above species we would assign, tentatively to this genus, *Blatta guttata* Thunberg, described from St. Bartholomew, on the basis of a female.[1]

Eurycotis lacernata Cabrera

Plate XII, Figures 6 and 7

Eurycotis fischeriana (err. for *finschiana*) Rehn (not of Saussure), 1903, Trans. Amer. Entom. Soc., XXIX, p. 278. (In part.) San Diego de los Baños, Pinar del Rio, Cuba.

Eurycotis finschiana Rehn (not of Saussure), 1909, Second Rep. Centr. Exper. Stat. Cuba, p. 185. (In part.) San Diego de los Baños, Pinar del Rio, Cuba.

Eurycotis lacernata Cabrera, 1922, Mem. Soc. Cub. Hist. Nat. "Felipe Poey," IV, p. 94. Camoa, Havana Province, Cuba.

By an unfortunate misunderstanding Señor José Cabrera, who collected a portion of the material of the species now before us, very recently published the manuscript names *E. lacernata* and *balteata* supplied to him by us, together with descriptions of the more striking color features of the species.

The original author of this species has placed in our hands, for the collection of the Academy of Natural Sciences of Philadelphia, the typical series of both of these species. The names as used by Señor Cabrera are perfectly valid and must be credited to him, as no part of the description was written by either of the present authors. We are permitting our detailed description of the figured allotypic female, which was prepared before the name was published, to appear, as originally drawn. We have selected as single type a male of the original lot sent by Señor Cabrera, and have given its essential differences from the description of the female.

This is probably the most strikingly distinctive of the smooth species of the genus, its solidly bicolored pattern readily separating it from all others we have seen. The diagnostic features are given in the key.

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[1] The description of this species (1810, Kongl. Vet.-Akad. Handl., XXXI, p. 188) is not adequate to place the form, but it is probably a *Pelmatosilpha* or a *Eurycotis*, and we incline toward the latter assignment, as the mention of tegmina and reference to the specimen as an immature female show those organs were probably reduced and laterad, and clearly not as elongate as in *Pelmatosilpha*. From this the specimen was probably an adult female. The abdominal segments are said to be maculate with flavescent, as is the case with the caudal angles of the pronotum and tegmina, while the size was given as about that of *Blatta orientalis*. We have nothing that we can with certainty place under Thunberg's name, which probably represents a distinct species from those here treated. Shelford (1908, Trans. Entom. Soc. London, p. 467) has given the present position of the name as that of a synonym of *Rhyparobia maderæ* (*Leucophæa maderæ* of the present authors), on the immature form of which species he considered *guttata* was based. In appreciation of Mr. Shelford's discernment we would conclude that, from such an assignment, he did not see Thunberg's original specimen. The original description of its surface as "glabra, lævis" could by no possible stretch of the imagination fit the immature of the species to which he assigned it. The original individual of *guttata* probably has been misplaced or lost, in the intervening years, and a substitution made, which was not checked from the description by Shelford. As Rehn has shown elsewhere (Proc. Acad. Nat. Sci. Phila., 1918, p. 145, footnote 3) it is quite evident Shelford did not see the original material of DeGeer's *Blatta minutissima* in his study of the DeGeerian collections, a specimen of *Holocompsa* having been associated with that name, while the original description, as well as the figure of DeGeer's insect, demonstrates that an *Anaplecta* of the *lateralis* type was before the older author.

Description of Allotypic Female.—Cotorro, Havana Province, Cuba. February, 11, 1919. (José Cabrera.) [Academy of Natural Sciences of Philadelphia.]

Size medium; form distinctly depressed, subelliptical in outline; surface glabrous, distinctly polished on the dark areas of the body.

Head very broad, nearly as broad as deep, almost completely hidden under pronotum; occiput well and regularly arcuate between eyes; interocular space very broad, very slightly greater than that between antennal scrobes; eyes not prominent, not extending ventro-caudad of the ventral margin of the antennal scrobes. Palpi relatively slender; fourth joint appreciably shorter than third, infundibuliform; fifth joint subequal to third in length, slightly arcuate, narrowing in profile from proximal third, apex blunt acute. Antennæ distinctly surpassing body in length, setaceous, proximal joint moderately inflated.

Pronotum short semi-ovate, greatest length contained one and one-half times in greatest caudal width: cephalic margin over head rather narrowly arcuato-truncate; caudal margin truncate, very slightly convex laterad to the narrowly rounded rectangulate caudo-lateral angles; lateral margins regularly arcuate divergent caudad, all margins very finely cingulate: surface virtually without impressions, whole pronotum in transverse section regularly arcuate.

Tegmina reaching and but faintly surpassing distal margin of mesonotum, lateral, separated by about one and one-half times proximal width of tegmen, this proximal width subequal to their length; costal margin nearly straight, markedly cingulate, disto-caudal angle broadly rounded, the tegmina regularly narrowing distad by arcuation of the sutural margin. Mesonotum truncate caudad. Metanotum with its caudal margin obscurely biarcuate, median blunt angulation weak; laterad the segment is distinctly cingulate, rectangulate caudo-laterad.

Abdomen with tergites narrowly but distinctly cingulate laterad, caudo-lateral angles becoming progressively acute or spiniform distad, being distinctly spiniform produced on the two distal normally exposed segments. Supra-anal plate subtrigonal, slightly transverse, moderately tectate, not carinate dorsad, lateral margins weakly sigmoid, regularly convergent distad, apex rather broadly but very decidedly V-emarginate. Cerci but little surpassing apex of supra-anal plate, broad, depressed dorsad, fusiform, the apex slightly attenuate, acute. Subgenital plate of moderate size, more deplanate than usual in subfamily, distal margin of valves forming an obtuse angle.

Limbs moderately robust. Cephalic femora with ventro-cephalic margin having a regular series of spines, distal large spines of this margin three in number, increasing in length distad. Caudal tibiæ appreciably longer than femora, slender proximad, inflated when seen in both aspects, surface largely pitted and pocked; extensor surface broad, poorly defined, without marginal carinæ: caudal tarsi two-thirds as long as caudal tibiæ, subcompressed; metatarsus subequal in length to remaining tarsal joints, pulvillus apical.

Selected Type.—Male; Camoa, Havana Province, Cuba. June 10, 1921. (José Cabrera.) [Academy of Natural Sciences of Philadelphia, Type No. 5387.]

The features of the male sex here given are those of difference from the above description of the female allotype.

Size relatively small (for genus). Pronotum with greatest length contained slightly less than one and one-half times in greatest caudal width; caudal margin more completely truncate.

Supra-anal plate transverse, subtrapezoidal, distal margin bilobate, with obtusely angulate median emargination. Cerci damaged. Subgenital plate short, strongly transverse, stylar fossæ distinctly lateral in position, dextral relatively shallow, sinistral much more extensive, distal margin between stylar fossæ moderately but unsymmetrically arcuate; styles relatively long, slender, tapering, appreciably incurved, particularly distad.

General color of dorsal surface shining warm brownish black, margined laterad by relatively broad bars, varying in different individuals from pale zinc orange to light cadmium, these bars narrowing cephalad on lateral portions of pronotum and very narrowly failing to meet dorsad of head, approximately subequal in width from caudal margin of pronotum to middle of sixth[1] abdominal tergite, where the bars stop abruptly, their width at the tegmina being approximately subequal to that of latter, but the very narrowest proximal portion of the sutural margin of which is dark. Dark pronotal disk rather horseshoe-shaped in peripheral outline; lateral cingulate margins of the thoracic segments and abdomen and costal margin of tegmina very finely pencilled with dark. Head, ventral surface of thoracic segments and limbs dull light cadmium to antimony yellow, with the following exceptions: face with a reversed trigonal to heavy T-shaped marking of the dark dorsal color, which involves a broad interocular bar, a thick vertical shaft, narrowing ventrad, and a much weaker, connected lining of the facio-clypeal suture; infra-ocular lateral margins of face with or without infuscate maculations; median and caudal coxæ with several infuscate lines; femora with dorsal margin lineate with mars brown; caudal tibiæ and tarsi russet to mars brown, the distal tarsal joint generally paler (degree variable). Venter of abdomen and subgenital plate ranging individually from chestnut to nearly as deep as the dorsal dark color, with lateral pale borders complementary to those of dorsal surface in distribution and color, but slightly narrower and less sharply defined mesad; lateral portions of distal abdominal sternite proportionately darker than remainder of venter. Antennæ ochraceous-tawny to prout's brown. Eyes ranging from the dark dorsal color through clove brown to hair brown.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Length of Caudal Tibia
♂, Camoa, Cuba, type.	20.2	6	8	3.1	7.2mm.
♂, Camoa, Cuba, paratype..............	19.6	6.3	8.8	3.5	7.5
♀, Cotorro, Cuba, allotype..............	24	7	9.9	4.1	8.9
♀, Camoa, Cuba, paratype..............	21.8	6.2	9	3.8	8
♀, San Diego de los Baños, Cuba.........	21	6.5	9.4	3.6	8.2
♀, "Cuba,"..........	24.2	6.6	9.3	4.2	8.4

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[1] Counting median segment as tergite one.

In addition to the female allotype and the selected single type described above, we have before us a paratypic male and female, as well as an immature male, from Camoa, with the same data as the type, now in the collection of the Academy of Natural Sciences; a female from San Diego de los Baños, Pinar del Rio Province, Cuba, taken April 22, 1900, by Palmer and Riley, and in the collection of the United States National Museum; a female labelled simply, "Cuba, Ch. Wright," in the collection of the Museum of Comparative Zoölogy. The "Cuba" specimen is appreciably paler than the others, but the color range is slight, and the species is a most striking and easily recognized one.

The San Diego de los Baños individual previously had been reported in error by Rehn as "*E. fischeriana*," a typographical error for *finschiana*. At that time Rehn failed to distinguish the species here described as *lacernata*, *torquinensis* and *balteata*, but of the specimens then available that belonging to *balteata* was immature, that of *torquinensis* a male, that of *lacernata* a female. Additional material now available demonstrates the composite character of his reference, while *finschiana* is seen to be a synonym of *E. opaca*.

In the six adult specimens available we find the number of spines on the ventro-caudal margin of the cephalic femora varies from five distal and median, through three distal and one median spine to two distal and no median spines.

This species may be restricted to western Cuba.

Eurycotis bahamensis Rehn

Plate XII, Figure 8

Eurycotis bahamensis Rehn, 1906, Bull. Amer. Nat. Hist., XXII, p. 110, Fig. 10. ♂, ♀; Fish Hawk Key, Andros Island, Bahamas; Little Golding Key, Andros Island, Bahamas.

Bahamas.—Mangrove Key, 1904, (O. Bryant), 1♂, 1♀, [Hebard Cln.]. Eleuthera Island, April 11 to 20, 1897, (C. J. Maynard), 1 immature ♀, 1 very small immature individual, [M. C. Z.].

The material recorded from Mangrove Key, Bahamas, by Morse as *Eurycotis* species indet.,[1] we now know to be the present species, as suggested by Rehn.[2] The above recorded pair of this species in the Hebard Collection formed part of the series examined by Morse.

This species is in one feature the most distinctive of the West Indian forms of the genus. The metatarsal pulvillus of the caudal tarsi are far more elongate than in any of the other forms examined, being equal to distinctly more than one-half of the metatarsal length. The immature female from Eleuthera is in the instar preceding maturity, but the elongation of this pulvillus is there evident, although much less decided than in the adults. The very small Eleuthera individual has lost the caudal tarsi.

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[1] 1905, Psyche, XII, p. 19.
[2] 1900, Bull. Amer. Mus. Nat. Hist., XXII, p. 110.

In coloration the Mangrove Key adults show no noteworthy differences from the original description and figure. The median and cephalic tibiæ, however, are in part very distinctly paler than the caudal tibiæ, although all are infuscate to a degree distad and along the margins. The immature specimens have the tibiæ more uniformly infuscate. The Eleuthera female in the instar preceding maturity had the thoracic markings virtually as figured, except that the prothoracic markings are united cephalo-mesad, a condition closely approached in the Mangrove Key male. The abdomen in this immature female shows weak transverse pale bars on the three proximal tergites. The very small Eleuthera immature specimen (9.2 mm. long) has the head dorsad of the inter-antennal bar solidly infuscate; the pronotal disk with a large transverse, subelliptical median blotch, a narrow cephalic, broadening lateral and narrow caudal margins pale, the immediate caudal margin of the segment narrowly darkened; meso- and metanotum mesad largely dark, with poorly defined lateral pale borders; abdomen solidly blackish fuscous dorsad and ventrad.

Eurycotis torquinensis, new species

Plate XII, Figures 9 to 12

Eurycotis fischeriana (err. for *finschiana*) Rehn (not of Saussure), 1903, Trans. Amer. Entom. Soc., XXIX, p. 278. (In part.) Torquino Peak, Cuba.

Eurycotis finschiana Rehn (not of Saussure), 1909, Second Rep. Centr. Exper. Station Cuba, p. 185. (In part.) Torquino Peak, Cuba.

The small size, variegated pattern, characteristic face marking and bilobate male supra-anal plate, combined with subquadrate tegmina, will serve to differentiate this very distinct species. It is probably a montane form of localized distribution, not being represented in the series taken in the Monte Toro and Monte Libano region near Guantanamo. We have discussed under *E. lacernata* our previous reference of that species to *fischeriana* (err. for *finschiana*).

Type.—Male; Torquino Peak, Sierra Maestra, Oriente Province, Cuba. Elevation, 5900 feet. April, 1912. (S. Harbert Hamilton.) [Academy of Natural Sciences of Philadelphia, Type No. 5361.]

Size small (for the genus); form moderately depressed, elongate elliptical; surface moderately shining, obscurely impresso-punctulate on tegmina and distad on abdomen.

Head almost completely hidden under pronotum; broad, with face moderately deplanate; occiput moderately arcuate, eyes not prominent: interspace between eyes appreciably greater than that between antennal scrobes. Antennæ in length surpassing body, being half again as long as latter, setaceous; proximal joint moderately enlarged. Palpi essentially as in *lacernata.*

Pronotum of general type found in *lacernata*, but cephalic margin more arcuate and hardly at all truncate, caudal margin gently arcuate throughout, caudo-lateral angles more broadly rounded.

Tegmina short, lateral, subquadrate, in length slightly surpassing distal margin of metanotum, and then only by the disto-costal extremity, separated from one another by nearly the width of a single tegmen, proximal width of tegmen slightly greater than costal length: costal margin weakly arcuate, very appreciably cingulate; disto-costal angle well rounded rectangulate; distal margin sub-oblique, nearly transverse, almost imperceptibly concave; disto-sutural angle rounded obtuse; sutural margin weakly arcuate. Mesonotum with distal margin truncate. Metanotum subequal in width mesad and laterad; lateral margins distinctly cingulate, caudo-lateral angles sharply rectangulate; caudal margins subtruncate, with a faint median projection.

Abdomen with tergites produced, spined and cingulate laterad as in *lacernata.* Supra-anal plate of male transverse, bilobate, from lateral cercal emarginations the margins regularly narrow to the distinct paired lobulations, median emargination broadly obtuse-angulate, moderately deep, distal portion proper with sparse, elongate, chætiform hairs; dorsal surface of male supra-anal plate not tectate, shallowly subexcavate laterad. Cerci approximately twice as long as supra-anal plate, attenuate fusiform, broad, depressed dorsad. Subgenital plate transverse, arcuate subtruncate between styles, which are inserted in relatively large sockets; styles but little shorter than the segment, slender, tapering, very faintly incurved, apex blunt. Concealed genitalia: sinistral hook with its apex recurved, moderately enlarged, its distal margin subtruncate, the two angles bluntly produced yet rounded; dextral spine broad, lamellate, distad developed into a slightly recurved, moderately heavy, spiniform hook.

Limbs moderately robust. Cephalic femora having series of nine spines on distal two-thirds of ventro-cephalic margin, distal group of spines three, increasing in length distad; ventro-caudal margin of cephalic femora with three spines on distal third. Median tibiæ moderately expanded. Caudal tibiæ in length slightly surpassing caudal femora, moderately inflated, narrowed proximad, moderately deplanate; extensor surface narrow, flattened, its bounding margins largely acute: caudal tarsi moderately compressed, with metatarsus faintly shorter than remainder of tarsus, pulvillus apical.

General base color mustard yellow to pale chamois, becoming isabella color on third to seventh abdominal tergites and mesad on the proximal sternites. Dark pattern blackish fuscous; abdominal tergites very narrowly lined on their caudal margins, and thoracic segments with a narrow intermarginal wash on same margin, claret brown. Head with a sharply contrasted interocular and facial dark marking, which in shape is a broad isosceles triangle, apex ventrad, base interocular, reaching from eye to eye; clypeal suture with a distinct, transverse infuscation; ocellar region with paired reniform blotches of fuscous; antennæ buckthorn brown proximad, gradually passing into fuscous distad; eyes cinnamon-brown. Pronotum with a pair of longitudinal, well-separated, subparallel, lanceolate dark markings, which are acute caudad, rounded cephalad; cingulate margins pencilled with fuscous, very obscurely so caudad. Tegmina with sutural half fuscous, pale to claret brown disto-suturad, this sharply contrasted with pale costal half; cingulate costal margin lined with ochraceous-tawny; mesonotum mesad with faint rufescent pattern. Metanotum with lateral cingulate borders lined similarly to costal margin of tegmina; in the relative position of articulation of the wings, and as a component of the longitudinal pattern, is placed an ovate dark spot, half as long as segment. Abdomen with proximal tergites washed ratherly obscurely with claret brown; dark transverse bars of proximal tergites failing to reach lateral margins of the segments; lateral cingulate margins of tergites finely pencilled with rufescent: apex of abdomen from and including distal portion of sixth tergite blackish fuscous, supra-anal plate in part obscurely rufescent, subgenital plate chestnut; fifth abdominal sternite narrowly ochraceous laterad. Limbs not markedly infuscate except at spine insertions and margins of extensor surface of caudal tibiæ; caudal tarsi passing to dull orange-ochraceous.

Length of body, 19.2 mm.; length of pronotum, 6.2; greatest width of pronotum, 7.7; length of tegmen, 3.2; proximal width of tegmen, 3.5; length of caudal tibia, 7.

This most interesting and distinctive species is known only from the type.

Eurycotis balteata Cabrera

Plates XII, Figures 13 and 14; XIII, Figure 1

Eurycotis fischeriana (err. for *finschiana*) Rehn (not of Saussure), 1903, Trans. Amer. Entom. Soc., XXIX, p. 278. (In part.) San Diego de los Baños, Pinar del Rio Province, Cuba.

Eurycotis finschiana Rehn (not of Saussure), 1909, Second Rep. Cent. Exper. Station Cuba, p. 185. (In part.) San Diego de los Baños, Pinar del Rio Province, Cuba.

Eurycotis balteata Cabrera, 1922, Mem. Soc. Cuban. Hist. Nat. "Felipe Poey," IV, p. 94. Camoa, Havana Province, Cuba.

For comments on the publication of this name by Cabrera, see above under *E. lacernata*. As Cabrera's diagnosis is solely of the more evident color features, we are giving a detailed description of structural and color characters.

Señor Cabrera has placed in our hands the original material upon which the name *balteata* was based, from which we select the type and allotype here indicated.

The present species is very close to *ferrum-equinum*, described below, but it can be distinguished by the infuscate caudal tibiæ, the solidly dark dorsal apex of the abdomen and the complete character of the transverse dark linings of the proximal abdominal tergites, the broadly bilobate instead of broadly emarginato-truncate distal margin of the supra-anal plate, and certain other less evident features, such as the broader extensor face of the caudal tibiæ, and the spectacle-like character of the pronotal dark markings.

Selected Type.—Male; Camoa, Havana Province, Cuba. June 16, 1921. (José Cabrera.) [Academy of Natural Sciences of Philadelphia, Type No. 5388.]

Description of Male.[1]—Cotorro, Havana Province, Cuba. February 11, 1919. (José Cabrera.) [Academy of Natural Sciences of Philadelphia.]

Size relatively small (for the genus); form ovate, broad, abdomen broader than thorax, depressed; surface smooth, weakly shining, particularly on dark areas.

Head almost completely hidden under pronotum, broad, its greatest width across eyes slightly greater than its greatest depth: occipital outline weakly arcuate; interocular spaces very broad, appreciably broader than the width between antennal scrobes. Palpi as described in *E. lacernata*. Antennæ at least as long as the body (apex incomplete in material before us). Eyes little prominent.

Pronotum with its greatest length contained nearly one and two-fifths times in greatest caudal width, semi-orbicular: cephalic margin relatively narrow, weakly arcuate, regularly passing into the caudad divergent lateral margins, which are arcuate; ventro-caudal angles narrowly rounded rectangulate; caudal margin truncate; all margins narrowly cingulate: in transverse section the pronotum is arcuate, latero-cephalad with a subcucullate tendency.

Tegmina lateral, separated by nearly twice the width of a single tegmen, lobiform, narrowing distad, with a weak subquadrate tendency, proximal width slightly greater than the length; costal margin cingulate, nearly straight, distad strongly arcuate to the arcuate distal margin, which is subtransverse; sutural margin oblique truncate, disto-sutural angle obtuse, evident; surface of tegmina punctulate; apex of tegmina not surpassing mesonotal distal margin. Mesonotum with distal margin truncate. Metanotum with caudal margin very weakly biconcave, median point weak but evident.

Abdomen with lateral margins of tergites cingulate, caudo-lateral angles of same progressively more acute to spiniform distad. Supra-anal plate transverse, its distal margin broadly bilobate, very weakly subtectate mesad, surface faintly subexcavate laterad. Cerci about twice as long as supra-anal plate, relatively heavy, fusiform, depressed dorsad. Subgenital plate and styles of the type found in *E. torquinensis*. Concealed genitalia; dextral spine much as in *torquinensis*, but tapering more gradually from lamellate proximal portion to spiniform distal section, lamellate portion also less expanded.

Limbs robust. Caudal tibiæ markedly inflated, narrowing proximad, appreciably depressed, surface punctate; extensor surface with its bounding margins distinct but non-carinate; caudal tarsi three-fourths as long as caudal tibiæ, moderately compressed; metatarsus slightly shorter than combined length of other tarsal joints, pulvillus occupying one-fourth of metatarsal length.

Allotype.—Female; same data as type. [Academy of Natural Sciences of Philadelphia.]

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[1] The condition of the type is by no means as good as is that of a male from Cotorro, Cuba, sent to us some years ago by Señor Cabrera, and which formed the basis of our recognition of the species. This specimen, we had figured before Cabrera described the species, and we feel fully warranted in permitting our original description of this male to stand unaltered.

The features given below are those of noteworthy difference from the description of the male given above.

Supra-anal plate subtrigonal, apex as seen from dorsum moderately concave, seen in caudal aspect narrowly rounded rectangulate-emarginate; in transverse section plate is distinctly tectate. Cerci as in male but, due to greater production of supra-anal plate, the proportion in relation to that plate is much less, the cercal apices surpassing that of supra-anal plate by approximately one-third of the length of plate. Subgenital plate as usual in female of genus, relatively small, not extending laterad beyond infra-cercal region.

General base coloration of head, thoracic segments and dorso-proximal portion of abdomen, antimony yellow; overlying dark pattern of dorsum and occiput, warm blackish fuscous, the distribution of this pattern as here given. Head with a relatively broad, solid, dark interocular bar; antennæ brickred; eyes deep mummy brown. Pronotum with a paired dark distal pattern, made up of lateral lanceolate blotches, somewhat oblique in their disposition, connected cephalad by a bar subequal in width to the occipital interocular bar, the whole somewhat spectacle-shaped; caudal margin of pronotum between the points dorsad of the normal articulation of the tegmina broadly dark margined, this faintly narrowing mesad; pronotal margins elsewhere finely margined with blackish, this wider laterad. Mesonotum and metanotum with their caudal margins marked similarly to that of the pronotum, remainder of the caudal and lateral margins finely margined with blackish; metanotum with a dark spot on each side in the usual position of the wing articulation. Tegmina with costal margin distinctly lined with dark, distal and sutural margins similarly pencilled with chestnut-brown. Abdomen with the sixth and subsequent abdominal tergites, to and including supra-anal plate, solidly dark; proximal tergites completely transverse barred on their distal margin with dark, the bars equal in width and continued to and confluent with the narrow dark lateral pencilling of the tergites; cerci and supra-anal plate tending toward liver brown; venter of abdomen solidly dark, passing from dark liver brown proximad to liver brown on the subgenital plate, except that the five proximal sternites have lateral ocelliform antimony yellow spots; styles liver brown, becoming blackish at apex. Limbs of the pale general color with spines liver brown, except that the caudal tibiæ and tarsi, exclusive of distal joint and claws, are solidly liver brown, becoming more blackish fuscous on the second, third and fourth tarsal joints, fifth joint and claws dull zinc orange.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum
♂, Camoa, Cuba, type	21.3	6.5	8.8
♂, Cotorro, Cuba	19.2	6.5	9.4
♀, Camoa, Cuba, allotype	22.8	6.6	8.5

	Length of Tegmen	Proximal Width of Tegmen	Length of Caudal Tibia
♂, Camoa, Cuba, type	3.7	3.1	7.8mm.
♂, Cotorro, Cuba	3.4	3.2	8
♀, Camoa, Cuba, allotype	3.8	3.2	8.3

In addition to the type, the described male and allotype, we have before us an immature male and an immature female, bearing the same data as the type and allotype, also an immature female from San Diego de los Baños, Pinar del Rio Province, Cuba, taken April 22, 1900, by Palmer and Riley,[1] from the collection of the United States National Museum. The adults are quite uniform in coloration, but the three immature individuals show appreciable variation. That from San Diego de los Baños is essentially as described for the adults, except that the caudal tibiæ and tarsi are paler, more hay's russet, the spines of all the limbs more cinnamon brown to buckthorn brown. Those from Camoa, however, have the paired pronotal marking more extensive caudad, laterad reaching and fusing with the dark caudal margin of the pronotum. Lateral dark patches on the other thoracic segments, in continuation of the pronotal markings, are well indicated, the transverse abdominal barring is somewhat heavier, and the tibial coloration is as noted in the San Diego de los Baños specimen.

This species may prove to be restricted to western Cuba.

Eurycotis ferrum-equinum,[2] new species

Plate XIII, Figures 2 to 5

This species is closely related to *E. balteata*, with which it has been compared in the diagnosis of the latter on a preceding page. The absence of a solidly dark apex to the abdomen, the lateral evanescence of the transverse lining of the proximal abdominal tergites, the pale caudal tibiæ and the shape of the dark pronotal marking will serve to distinguish *ferrum-equinum* from *balteata*, while the maculate pronotum will immediately distinguish it from those species which follow in the sequence here adopted.

Type.—Male; La Union, Monte Libano, Oriente Province, Cuba. May 18, 1913. (C. T. Ramsden; under stones in woods.) [Academy of Natural Sciences of Philadelphia, Type No. 5363.]

Size relatively small (for the genus); form elliptical, abdomen slightly broader than thorax; surface moderately shining, particularly that of dorsal surface.

Head little evident cephalad of pronotum, its greatest width across eyes subequal to the depth of head: occiput and eyes regularly arcuate in outline; interocular width appreciably greater than that between antennal scrobes. Eyes not prominent. Palpi as in the species described above. Antennæ surpassing body in length.

Pronotum semi-orbicular, with its greatest length contained one and one-half times in its greatest caudal width; cephalic margin arcuato-truncate, passing into the broadly arcuate lateral margins; caudal margin truncate in median three-fifths, laterad weakly oblique to the latero-caudal angles, which are nearly rectangulate, but slightly more obtuse; entire margins finely cingulate: in transverse section pronotum is regularly arcuate, weakly sub-cucullate over eyes.

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[1] This specimen Rehn has already reported as *E. fischeriana* (err. for *finschiana*). For reference see above and under *E. lacernata*.

[2] In allusion to the horseshoe-shaped pronotal marking.

Tegmina lateral, broad lobiform, their proximal width slightly less than their length, their apices very faintly surpassing caudal margin of mesonotum, sutural margins separated by a space equal to one and one-half times the width of a single tegmen; costal margin arcuate and weakly flattened in outline; sutural margin regularly arcuate, approaching costal margin to the well-rounded apex; costal margin distinctly cingulate. Mesonotum with distal margin truncate. Metanotum longer laterad than mesad, caudal margin broadly but weakly biconcave, median projection separating the concavities slight; caudo-lateral angles rectangulate; lateral margins flattened arcuate, cingulate.

Abdomen with lateral margins of sternites having caudal angles, progressively distad, acute to spiniform produced, cingulate. Supra-anal plate moderately transverse; lateral margins converging distad; distal margin broad, very shallowly and broadly obtuse-angulate emarginate, supplied with long, spaced bristles, disto-lateral angles markedly developed, obtuse-angulate; surface of plate moderately impressed latero-distad. Cerci nearly twice as long as supra-anal plate, heavy, broad, fusiform, depressed dorsad, immediate apex moderately acute. Subgenital plate as in species described above: styles elongate, slender, tapering, faintly incurved, apex not blunted.

Limbs robust. Cephalic femora with nine spines distributed over distal two-thirds of ventro-cephalic margin, the distal group three in number, increasing in length distad; ventro-caudal margin of cephalic femora with three spines on its distal portion. Caudal tibiæ somewhat longer than the femora, appreciably inflated, narrowed at proximal extremity, distinctly depressed, surface of caudal tibiæ cribroso-punctulate; extensor surface narrow, margins limiting the same evident, in part carinate. Caudal tarsi three-fourths as long as caudal tibiæ, compressed; metatarsus subequal in length to remaining tarsal joints, pulvillus of metatarsus covering distal fourth of ventral surface.

Allotype.—Female; same data as type. [Academy of Natural Sciences of Philadelphia.]

Differs from the description of the male type in the following features.

Size slightly larger. Supra-anal plate moderately produced, lateral margins weakly sigmoid, converging distad; distal margin broadly, relatively deeply and regularly arcuate-emarginate, lateral angles faintly acute; surface of supra-anal plate faintly impressed in vicinity of lateral angles and at bottom of distal emargination, elsewhere regularly arcuate transversely. Cerci one and one-third times as long as supra-anal plate, faintly more attenuate than in male. Subgenital plate not markedly prominent, distal margin arcuate-obtuse-angulate, in profile with distal extremity narrowly subtruncate.

General base coloration ochraceous-buff, ventrad with a slight light ochraceous-salmon tendency on the coxæ, median section of dorsum of thoracic segments (allotypic female and one immature individual), and occasionally the abdominal sternites (one immature), weakly rufous. Dark pattern blackish fuscous, distributed as here described. Head with a decided dark interocular bar, which is generally quite wide, but varies, being appreciably narrower in the type than in other specimens; antennæ tawny to cinnamon brown, passing into fuscous or mummy brown distad; eyes fuscous to hair brown. Pronotum with the black pattern decided, prominent, horseshoe-shaped, the sides very rarely (in paratypic female) narrowly separated cephalad by a fine pale line; median pale area, within the horseshoe, roughly trilobate to more distinctly triangular, bearing in the males a semicircular series of fine dark points cephalad, these occasionally incomplete mesad (in a paratypic female), complete in the type, a caudal pair of similar points indicated in both sexes, the horseshoe-shaped pattern in adults not fully connected with the broad blackish caudal margin of the pronotum, the latter not reaching the caudo-lateral angles, its median width less than that over the normal points of tegminal articulation: entire cingulate margin of the pronotum narrowly dark, slightly more broadly so laterad. Tegmina uniformly pale, except for the russet pencilling of the costal margin. Mesonotum and metanotum with the caudal margins marked with dark similarly to that of the pronotum, the lateral depth of the markings greater, their failure to reach the lateral borders similar; disk of both segments with a few transversely disposed fine points of fuscous; lateral margins of metanotum pencilled with russet. Abdomen with the transverse bars indicated on all tergites, conspicuously made up of one element proximad on one tergite and another distad on the preceding tergite, the bars narrowing laterad and failing to reach the lateral margins, latter pencilled with russet to mars brown; in the broadly exposed ultimate tergite the fuscous largely monopolizes the segment, the pale color being restricted to transversely disposed spots of pale orange-rufous; supra-anal plate in both sexes blackish fuscous proximad and with a median gradually narrowing spur extending caudad, this dividing the pale portion into two large lateral areas: venter of abdomen with the dark area varying from one extreme, where the greater portion is blackish fuscous, except for pale lateral borders and median transverse dashes of pale on the proximal sternites (type), to another where the dark area is virtually restricted to the subgenital plate, median portion of the ultimate and mesocaudal portion of the penultimate abdominal sternites (paratypic female). Cerci burnt sienna to mahogany red, distad passing to ochraceous. Limbs with spines rufous to fuscous, frequently russet tipped with fuscous; caudal tibiæ variably, but always rather weakly, washed with russet, this more evident nearer the flexor surface.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum
♂, type	20.2	6.4	9
♀, paratype	23.6	7	9.6
♀, allotype	22.9	6.5	9

	Length of Tegmen	Greatest Width of Tegmen	Length of Caudal Tibia
♂, type	3.7	3.2	7.4mm.
♀, paratype	4.4	3.3	8.5
♀, allotype	3.4	3 2	8.4

In addition to the type and allotype we have before us a paratypic female, bearing the same data as the type; two immature females with similar data, and one small immature specimen from Baracoa, Cuba, taken April, 1915, and from the collection of Mr. W. T. Davis. The La Union specimens are all in the collection of the Academy of Natural Sciences of Philadelphia. The paratypic female shows no noteworthy differences from the descriptions, but in the general coloration of the dorsum is more like the male type than the female allotype, while ventrad it is more like the allotype. The two immature females are in the instar preceding maturity, with their general pattern much as in the adults, but having regular continuous extensions of the pronotal horseshoe-shaped marking extending over the meso- and metanota, the pale lateral portions of the same segments as sharply contrasted as the lateral portions of the pronotum, the dark extensions connected with the blackish fuscous caudal margins of the same segments. In one immature specimen there is a tendency toward a continuation of these bars upon the abdomen, in conjunction with the transverse dark barring of the tergites of the same, while in addition there is a weak indication of a median longitudinal dark bar on the same tergites. The specimen mentioned above is the only individual seen by us showing closely the superimposing of a longitudinal dark pattern upon a transverse dark pattern on the abdominal tergites.

The very young specimen from Baracoa is interesting in that it has the pronotal disk virtually solid dark and the median sections of the mesonotum and metanotum infuscate to a considerable degree. It would appear from this that the bilineate type of coloration is not a primitive type. This conclusion is supported, in a measure, by the quite immature specimen of *E. bahamensis* mentioned above. In all the immature specimens the venter of the abdomen is solidly dark, except for the pale lateral margins.

The spination of the ventro-cephalic margin of the cephalic femora varies from ten to eleven in number, this variation found on the two limbs of the female paratype, while the ventro-caudal margin of the same femora has the spines varying from two to four, the paratypic female having two on one limb and three on the other, four being found on the single remaining cephalic femur of one of the La Union immature females.

The species is probably restricted to eastern Cuba.

Eurycotis galeoides,[1] new species

Plate XIII, Figures 6 and 7

Of the non-maculate pronotum group of species the present one can be distinguished from the others by all the abdominal sternites being barred and the abdomen without a large dark apical section, while the supra-anal plate of both sexes is particolored. From *scalaris* it also can be distinguished by the broadly bilobate supra-anal plate of the male, and from *dimidiata* and *scalaris* in addition by the broadly subquadrate tegmina, while from *caraibea* it can be separated by the much narrower, very well separated and distinctly lateral tegmina.

Type.—Male; La Union, Monte Libano, Oriente Province, Cuba. March 23, 1913. (C. T. Ramsden; under stones in deep woods.) [Academy of Natural Sciences of Philadelphia, Type No. 5364.]

Size relative small (for the genus); form ovate, considerably depressed; surface moderately polished.

Head almost entirely hidden under pronotum when seen from dorsum; occiput, with dorsal portion of eyes, regularly arcuate; interspace between eyes very broad, appreciably wider than area between antennal scrobes. Palpi of type found in other species of genus but more slender than usual. Antennæ at least half again as long as body. Pronotum semiorbicular, of type usual in genus, greatest length contained one and one-third times in greatest caudal width of same; cephalic margin of pronotum truncato-arcuate cephalad, passing regularly into the lateral margins, which are arcuate, almost imperceptibly flattened cephalad; caudal margin truncate, laterad slightly obliquely rounded to the rather narrowly rounded rectangulate latero-caudal angles; disk in transverse section regularly arcuate, latero-cephalic portion narrowly subcucullate; entire margin finely cingulate.

Tegmina lateral, lobiform, but faintly surpassing caudal margin of mesonotum, separated mesad by an interspace subequal to proximal width of single tegmen, greatest length and proximal width of tegmen subequal, outline faintly subquadrate; costal margin weakly arcuate, straighter proximad, disto-caudal angle well rounded rectangulate; sutural margin oblique arcuato-truncate, disto-sutural angle very faint, rounded obtuse; distal margin oblique arcuato-truncate, rounding to both bounding angles; costal margin cingulate. Mesonotum with caudal margin truncate. Metanotum slightly longer laterad than mesad; caudal margin, except for short truncate sections laterad, broadly and shallowly, but distinctly, concave, with a slight median projection; lateral margins of metanotum weakly arcuate, cingulate, caudo-lateral angles rectangulate.

Abdomen with lateral margins cingulate and caudo-lateral angles developed as usual in genus. Supra-anal plate transverse, distal margin bilobate, the lobes somewhat flattened, median emargination very broadly and shallowly V-shaped, distal margin with a row of distinct setæ; dorsal surface of supra-anal plate faintly tectate disto-mesad, laterad broadly subdepressed. Cerci slightly more than twice as long as supra-anal plate, fusiform, tapering in distal half, deplanate dorsad. Subgenital plate of type usual in genus; styles elongate, tapering, faintly incurved, apices slightly blunted.

Limbs moderately robust. Cephalic femora with ventro-cephalic margin armed on distal three-fourths with eleven to twelve spines, distal series three in number;

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[1] From γαλῆ—pole-cat, in allusion to the odor of certain species of the genus.

ventro-caudal margin with three to four spines on distal half. Caudal tibiæ appreciably surpassing caudal femora in length, distinctly inflated, narrowing at proximal extremity, distinctly deplanate; extensor face narrow, margins of extensor face distinct, but not carinate: caudal tarsi in length about equal to three-fourths of that of tibiæ, compressed; caudal metatarsus subequal in length to remaining caudal tarsal joints; pulvillus of metatarsus occupying the distal fourth of the latter.

Allotype.—Female; same data as type. [Academy of Natural Sciences of Philadelphia.]

Differing from the description of the type in the following noteworthy features.

Size slightly larger. Pronotum slightly more transverse, greatest length contained one and two-fifths times in greatest width of same. Interspace between tegmina slightly greater than in male, equal to one and one-third times the proximal width of a single tegmen. Supra-anal plate of the type usual in females of this genus, considerably produced; distal margin arcuate-emarginate, lateral angles obtuse-angulate; surface of plate arcuate-tectate in transverse section, weakly and restrictedly impressed proximo-laterad. Subgenital plate not prominent; distal margin obtuse-angulate with a very faint arcuation.

General color ochraceous-buff to near ochraceous-orange, very faintly pinkish beneath on the coxæ. Dark pattern blackish fuscous, very much restricted, indicated almost solely as abdominal segmental marginings, suffusion of the venter of the abdomen and markings of the head and limbs. Head with a broad interocular bar, this ferruginous to fuscous, paler dorsad, stronger ventrad, the ventral margin more decided than the dorsal one; eyes fuscous; antennæ of the general color, the proximal segments, other than the three basal ones, each darkened proximad with vinaceous-rufous (type) to carob brown. Pronotum with the entire cingulate margin lined with fuscous to burnt umber, the caudal margin with a narrow additional clouding of the same in the area usually broadly darkened in this genus; disk with obsolete indications, by sparse fine points and weak clouding, of a horseshoe pattern, but this is never strongly marked. Tegmina with costal margin pencilled with ferruginous; metanotum laterad edged with the same; caudal margins of mesonotum and metanotum marked similarly to the caudal margin of the pronotum. Abdomen with tergites transversely barred with blackish fuscous, these bars represented on the caudal section of each individual tergite and the proximal section of the succeeding tergite, bars narrowing very shortly before reaching the lateral margins, the latter and the remainder of the segmental caudal margins finely pencilled, this passing from the fuscous of the caudal margins to the ferruginous of the lateral margins: supra-anal plate rather narrowly transversely fuscous proximad; cerci ochraceous-buff to ferruginous, becoming paler distad; venter of abdomen fuscous to mars brown mesad, this varying from one extreme, which suffuses all of the venter of the abdomen except broad pale lateral margins of the sternites, to another where the dark area is limited to a median cloud covering the subgenital plate and most of the three distal sternites, the remainder pale; in the types between these two extremes the sternites included in the pale areas are margined with fuscous similar to the tergites. Limbs with spines hay's russet, fuscous tipped: caudal tibiæ with a narrow distal liver brown margining, which extends proximad on flexor section of the dorsal and ventral faces as a vanishing cloud.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Proximal Width of Tegmen	Length of Caudal Tibia
♂, type.....	20	6.7	9	3.7	3.4	8.7mm.
♂, paratype	21.5	7.4	10	4.5	3.8	9
♀, allotype.	24.5	7.8	11.2	4.2	4	9.2

In addition to the type and allotype we have before us a paratypic male, a paratypic female (minus the apex of the abdomen) and an immature female, all bearing the same data as the type.

These specimens show no structural differences of noteworthy importance, except in the number of spines on the margins of the cephalic femora. On the ventro-cephalic margins these vary from eleven to thirteen, the latter number being present solely on one limb of the type. On the ventro-caudal margin the number of spines varies from three to four.

Eurycotis dimidiata (Bolivar)[1]

Plate XIII, Figures 8 and 9

P[olyzosteria] dimidiata BOLIVAR, 1888, Mém. Soc. Zool. France, I, p. 125. ♂; Guantanamo, Cuba.

CUBA.—Arroyo Hondo, Guantanamo, Oriente Province, XI, 1913, (C. T. Ramsden), 1♂, 3♀, [A. N. S. P.].

Rio Seco Woods, San Carlos Estate, 12 kilometers from Guantanamo, Oriente Province, X, 4–8, 1913, (F. E. Lutz; in rotten logs), 2♀.

This species was recorded from under stones in the fields of Yateras, Oriente Province, by Gundlach. It would seem, from the data at present available, to be restricted in distribution, and probably limited to the eastern end of the island.

The resemblance of *dimidiata* to *galeoides* is very considerable, but the solidly dark apex of the abdomen of *dimidiata* will serve to separate the two.

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[1] Of the material recorded as *E. caraibea*, adventive in the United States, by Hebard (1917, Mem. Amer. Entom. Soc., II, p. 266), the Berwick, Pennsylvania individual should be referred to *dimidiata*, while the Ithaca specimen was correctly determined as *caraibea*. Hebard, in a footnote, has called attention to features of difference of the Berwick specimen from the Ithaca individual and the original description, but attributes these to individual variation. This the present series shows is not the case. His Berwick specimen was much discolored, the ocher base color much darkened by grease and the contrast of the dark abdominal bars reduced in consequence from the same cause, the general appearance thus much resembling *caraibea*, aside from the tegminal shape and proportions of the interspace between the tegmina.

It will be seen from the accompanying figure (Plate XIII, fig. 8) that the tegmina are more narrow and less subquadrate than in *galeoides*, while the interspace between the tegmina is appreciably greater. The transverse dark abdominal barring of *dimidiata* is narrower than in *galeoides*, while the ventral surface of the abdomen is solidly dark, except for the narrow ochraceous margining of the four proximal sternites. The limbs are more stocky than in *galeoides*, but the caudal tibiæ in structure are much as in the other species. The infuscation of the distal portion of the caudal tibiæ is marked and extends in a weakened condition proximad along what might be called the ridge of the dorsal and ventral faces, and the flexor surface, to the proximal region.

The male supra-anal plate is transverse, the distal margin very broadly and very shallowly obtuse-angulate emarginate, the lateral angles of the same very narrowly rounded, the distal margin with a regular series of spaced hairs; surface of the plate moderately impressed laterad. Cerci of male about twice as long as the plate, fusiform, attenuate distad, the dorsal surface deplanate. Subgenital plate of the type usual in the males of this genus; styles elongate, tapering, faintly incurved, the apices moderately acute. Concealed genitalia with the sinistral hook having its apex strongly recurved, the outer surface of the curve of the apex with a rounded obtuse angle, the apex proper decurved, non-spinose; dextral spine flattened transversely, upcurved, faintly narrowing distad to within a short distance of the apex, at which point it abruptly narrows to the subulate and very acute apical spination, the base of the dextral spine with a supplementary acute, but apically blunted, lobe. The female supra-anal plate is appreciably produced, subtrigonal, the distal margin with the emargination relatively deep and decided, from slightly obtuse to rectangulate in shape; surface of the plate tectate in transverse section, subdepressed laterad. Subgenital plate of female with distal margin subrectangulate; in profile the lateral outline of the plate has the distal portion truncate.

Eurycotis scalaris,[1] new species

Plate XIV, Figures 1 and 2

This species is more nearly related to *E. dimidiata* and *caraibea* than to any others. From *dimidiata* it can be distinguished by the peculiar marking of the proximal abdominal tergites, the non-inflated caudal tibiæ, the generally subtruncate form of the male supra-anal plate and the more elongate dextral hook of the internal genitalia of the same sex, this hook also bearing an elongate supplementary proximal spine. From *caraibea* the lateral lobiform tegmina, the maculate proximal abdominal tergites and the coloration of the venter of the abdomen will readily distinguish *scalaris*.

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[1] In allusion to the character of the coloration of the proximal abdominal tergites.

TYPE.—Male; Arroyo Hondo, Guantanamo, Oriente Province, Cuba. November, 1913. (C. T. Ramsden.) [Academy of Natural Sciences of Philadelphia, Type No. 5365.]

Size relatively small (for the genus); form elliptical, moderately depressed; surface weakly polished.

Head almost entirely hidden under pronotum, its greatest width across eyes subequal to greatest head depth; occiput, with eyes, regularly arcuate; interspace between eyes appreciably broader than that between antennal scrobes. Palpi of the general type usual in genus. Antennæ not complete, clearly surpassing body in length when perfect.

Pronotum semi-ovate,[1] with its greatest length equal to one and one-third times its greatest width: cephalic margin truncate, distinctly rounding laterad into the arcuate lateral margins, which are very faintly flattened on their cephalic portion; caudal margin truncate, faintly arcuate laterad to the rounded rectangulate caudo-lateral angles, all margins finely cingulate: in transverse section the pronotum is regularly arcuate, latero-cephalad faintly subcucullate.

Tegmina lateral, lobiform, narrowing distad, apex subtruncate and not surpassing distal margin of mesonotum, interspace between tegmina equal to one and one-half times proximal width of single tegmen; proximal width of tegmen contained one and one-half times in length of same; costal margin of tegmina arcuato-truncate, cingulate, disto-costal angle rounded rectangulate; sutural margin obliquely subarcuate; distal margin arcuato-subtruncate. Mesonotum with distal margin sinuato-truncate: metanotum with distal margin broadly and very shallowly arcuato-emarginate, with a median, slightly sub-acute lobulation; lateral margins of metanotum cingulate, caudo-lateral angles rectangulate.

Abdomen with lateral margins of sternites cingulate, caudo-lateral angles progressively acute-angulate to produced acute spiniform. Supra-anal plate transverse, lateral margins converging, distal margin transverse truncate, with a small, shallow but evident, median emargination, lateral angles very narrowly rounded; surface of supra-anal plate with a pair of distinct impressions disto-mesad, between them being a slight tectation. Cerci twice as long as supra-anal plate, moderately broad, fusiform, attenuate distad, apex acute, dorsal surface deplanate. Subgenital plate of the general type found in related species; styles elongate, tapering, slightly arcuate, apices weakly blunted. Concealed genitalia: sinistral hook of the general type found in *E. dimidiata*, but recurved portion heavier, broader, more truncate distad and with outer margin rounded rectangulate: dextral spine elongate, erect, weakly sinuate, slender, regularly tapering, not lamellate, apex spine-like; at base of main spine is a supplementary lobe which develops distad rather abruptly into an aciculate, very straight spine, which is parallel to and not greatly shorter than the main spine.

Limbs moderately robust. Cephalic femora with ventro-cephalic margin having eight to ten spines on distal two-thirds, distal group of spines three in number, markedly increasing in length distad. Caudal tibiæ about one and two-fifths as long as caudal femora, uninflated, subequal in width, not appreciably depressed; extensor surface relatively broad, not delimited by evident margins, regularly rounding into cephalic and caudal faces. Caudal tarsi about three-fourths as long as caudal tibiæ, appreciably compressed; metatarsus very faintly shorter than remaining tarsal joints; metatarsal pulvillus covering about distal fifth of metatarsus.

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[1] The description of the form of the pronotum is checked from the paratypic male, as the type has the pronotum somewhat crushed. The type, however, is more complete otherwise than is the paratype.

General coloration ochraceous-buff, occasionally (paratype) tending toward ochraceous-orange. Dark pattern, which is marked solely on the abdomen, occiput and caudal limbs, blackish fuscous. Head with the dark interocular bar broad; antennæ pale tawny, passing to russet distad; eyes prout's brown (type) to clove brown (paratype). Pronotum with the cingulate margins pencilled with fuscous, the caudal one occasionally (type) paler, more chestnut-brown; disk of pronotum with a poorly defined, weakly mars orange suffusion, this with a few subobsolete bay points. Tegmina and metathorax with costal (tegmina) or lateral (metanotum) margins pencilled with fuscous; caudal margins of meso- and metanotum pencilled similarly to that of pronotum; disk of meso- and metanotum with a few points of bay. Abdomen above with the four distal tergites solidly dark, the proximal tergites with transverse dark bars, these narrowly failing to reach the lateral margins of the tergites, nearly equal to the full length of the tergites at their lateral margins, and regularly narrowed to not more than half that width mesad, a small but distinct median widening of the bar producing a "vertebral" effect; ventral surface of the abdomen solidly dark, with very narrow pale borders on the equivalents of the tergites so supplied on the dorsal surface: supra-anal plate and cerci dark, washed with liver brown; cerci with a little ochraceous pre-apically, the tips dark. Limbs with spines russet to mars brown; caudal tibiæ distad narrowly washed with mars brown; caudal tarsi chestnut, the distal joint passing to burnt sienna.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen	Length of Caudal Tibia
♂, type.....	21.2	6.6	9[1]	3.5	3.1	8.2mm.
♂, paratype	23.4	7.2	9.6	3.6	3.1	9

In addition to the type we have before us a paratypic male bearing the same data as the type. This specimen is more rufescent than the type, and is slightly larger, but otherwise very similar. The two specimens show that the number of spines on the ventro-cephalic margin of the cephalic femora (aside from distal pair) varies from nine to twelve, there being a difference of two on the two limbs of each of the specimens, while the ventro-caudal margins of same show four in both individuals.

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[1] Estimated on account of crushing of pronotum.

Eurycotis caraibea (Bolivar)[1]

Plate XIV, Figures 3 and 4

P[olyzosteria] caraibea BOLIVAR, 1888, Mém. Soc. Zool. France, I, p. 126. ♂; Cuba.

CUBA.—Monte Libano, Oriente Province, IV, 13, 1913, (C. T. Ramsden), 1♂, 1 immature ♀, [A. N. S. P.].

In its uniformly pale coloration of the thorax, tegmina and proximal abdominal tergites, with the solidly dark distal abdominal tergites, and in the absence of barring from the pale proximal abdominal tergites, added to the transverse sub-rectangulate tegmina, this species is readily distinguishable from the other West Indian forms. The venter of the abdomen is solidly dark distad, with the proximal sternites dark with pale lateral borders of variable width.

The caudal tibiæ are appreciably but not decidedly inflated, narrowing proximad, weakly depressed; extensor face relatively broad, margins of extensor face not sharply marked. Supra-anal plate of male transverse, distal margin rather weakly bilobate, the median emargination relatively broad, not deep, obtuse-angulate, the distal margin supplied with a sparse series of regularly placed hairs; distal half of the plate with surface bi-impressed. Concealed genitalia of male; sinistral hook much as in *scalaris* but with extremity smaller and proximal portion more robust; dextral spine relatively broad, sublamellate proximad, mesad rather sharply narrowing to the distal portion, which is elongate, aciculate spiniform.

Gundlach reported this species from Yateras, east of Guantanamo, and it may be restricted in distribution to eastern Cuba.

Eurycotis tibialis Hebard

Eurycotis tibialis HEBARD, 1916, Entom. News, XXVII, p. 264, Pl. XIV, fig. 1 and text fig. ♂; San Francisco Mountains, Dominican Republic, Hispaniola: ♀; "San Domingo," Hispaniola: ♀; (adventive at) Orono, Maine.

This species, with *E. flavipennis* Saussure and Zehntner, represents a very distinct group, characterized by a more peculiar and decided expansion and impression of the caudal tibiæ, as emphasized in the key to the species given in this study. From the description of *flavipennis* the present form can be distinguished by its solidly uniform coloration and very distinctly larger size, and doubtless by features of the male genitalia, which sex of *flavipennis* is not known at this writing.

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[1] As we have stated above in a footnote under *E. dimidiata*, of the two specimens recorded by Hebard as *E. caraibea*, as adventive in the United States (1917, Mem. Amer. Entom. Soc., II, p. 266), one, that from Ithaca, New York, represents *caraibea*, the other, from Berwick, Penna., is a specimen of *dimidiata*. For comments see the footnote in question.

We have seen no material of *tibialis* additional to that used in the original description.

Eurycotis flavipennis Saussure and Zehntner

Eurycotis flavipennis SAUSSURE AND ZEHNTNER, 1893, 'Biol. Cent.-Amer., Orth.,' I, pp. 70, 71. ♀; Cuba.

We have not examined this species, which is apparently closely related to *E. tibialis*, treated above. There is, apparently, an omission of the word "tibiæ" in the original description a portion of which reads as follows: "Femora rufescentia, apice et marginibus subtus fuscis; posteriora subdilatata, apice leviter attenuata, faciebus binis planatis, subexcavatis punctatisque." It is evident to us that the word "tibiæ" has been omitted from between "posteriora" and "subdilatata," as we know of no cockroaches having femora so constructed, while the punctation suggests, and the features described picture, the type of development found in *tibialis*, so that we feel no hesitation in suggesting an omission has been made. No mention is made anywhere else in the description of the tibiæ. The features of difference from *tibialis*, after inferring a tibial similarity, have been given above under that species.

Eurycotis similis Caudell

Eurycotis similis CAUDELL, 1922, Univ. of Iowa Studies in Nat. Hist., X, p. 22, fig. 1. ♂, ♀; Antigua.

This striking species, of which we have before us a paratypic female from Antigua, received in exchange from the United States National Museum, through the kindness of Mr. Caudell, bears a close general resemblance to the Trinidadian *E. decipiens* (Kirby), which clearly is a member of the same species group as *similis*. Not having the male of *similis* it is not possible for us to compare the genital or other characters of that sex in the two species. A few notes drawn from the Antigua female of *similis* and a Trinidad male of *decipiens* may, however, prove of service. The face in *similis* bears the three dark bars as described by Caudell, while in *decipiens* there is the transverse bar on the vertex and a large irregularly trigonal blotch on the lower section of the face. The pronotum is not strongly and completely cingulate with a border of pitch black as in *decipiens*, instead this feature being weak and subobsolete caudo-laterad and narrow laterad; pronotal disk patch nearly "horseshoe-shaped," instead of being two nearly disconnected patches as in *decipiens*. The solidity of the dark coloration of the dorsal surface of the abdomen, instead of having transverse pale areas as in *decipiens*, and the uniformly dark color of the apex and most of the venter of the abdomen, are most distinctive. Structurally the caudal tibiæ of *similis* show no fusiform inflation in the female sex, when seen from above, while this feature is pronounced in the male of *decipiens*; when seen in lateral (extensor) aspect the caudal tibiæ show pronounced inflation in *similis*, while *decipiens* in this view shows none.

It is clearly evident that *decipiens* and *similis* are derivatives of a common stock, but in the present state of our knowledge we are unable to suggest from what center they developed. It is remarkable, however, that the nearest relative of a Trinidadian species should be found in Antigua, and not in one of the larger islands of the Lesser Antilles more directly in the axis of the chain.

Eurycotis opaca (Brunner)[1]

P[olyzosteria] opaca Brunner, 1865, 'Nouv. Syst. Blatt.,' p. 216. ♂; Cuba.

P[olyzosteria] finschiana Saussure, 1872, 'Mélang. Orthopt.,' II, pp. 106, 111. ♂, ♀; Cuba.

Polyzosteria cabreræ Bolivar, 1881, An. Soc. Españ. Hist. Nat., X, p. 335, Pl. VIII, fig. 3. ♂, ♀; Cuba.

Cuba.—Twelve and one-half kilometers south of Pinar del Rio, Pinar del Rio Province, IX, 12–23, 1923, (C. W. Leng; in pine and palmetto region), 1 immature ♀. Baños de San Vincente, seven kilometers north of Viñales, Pinar del Rio Province, IX, 16–22, 1913, (C. W. Leng; on palm), 1 very immature individual. Cotorro, Havana Province, IX, 1918, (José Cabrera), 2 ♂; V, 1922, (José Cabrera), 1 ♀, 5 immature specimens, [A. N. S. P.]. Camoa, Havana Province, V, 30, 1922, (José Cabrera), 8 immature specimens; VI, 11, 1922, (José Cabrera), 1 immature ♂, [A. N. S. P.]. Tapaste, Havana Province, (José Cabrera), 1 ♂, [A. N. S. P.]. Santiago de las Vegas, Havana Province, IV, 1905, (George Dimmock), 2 ♂, 2 immature ♀, [U. S. N. M.]. San Antonio de los Baños, Havana Province, IV, 1905, (George Dimmock), 1 immature ♀, [U. S. N. M.].

In addition to these specimens we have before us material from Varadero, Matanzas Province, north coast of Cuba, and San Diego de los Baños, Pinar del Rio Province, all of which have been mentioned by Hebard.[2] The specimen reported as *opaca* by the same author from Sancti

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[1] The records of *E. floridana* (Walker) from Cuba, made by Rehn (1903, Trans. Amer. Entom. Soc., XXIX, p. 277; 1909, Second Rep. Cent. Exper. Stat. Rep. Cuba, p. 185), relate to *E. opaca*, which since has been critically compared with *E. floridana* by Hebard (1917, Mem. Amer. Entom. Soc., II, p. 166).

[2] Idem, p. 166, footnote 271.

Spiritus, Santa Clara Province, Cuba,[1] as well as the adventive, then reported, taken at Orono, Maine, represent the closely related and here described *E. taurus*.

The synonymy given above is quite evident after a critical examination of the total series of six adult males, one adult female and twenty immature specimens of the species now before us, and of the original descriptions involved. It is evident that the present species exhibits variations in coloration, i. e., in the presence or absence of ochraceous or ochraceous-orange lateral margins to the pronotum, tegmina and mesonotum, parallel to the conditions seen in *E. floridana*, which have been fully treated by Hebard.[2] Saussure's *finschiana* was clearly based on immature individuals, without tegmina, having the broad pale lateral dorsal thoracic bands. Bolivar's *cabreræ* was based on adults possessing the same type of coloration.

Of the specimens before us one male and the female from Cotorro, the Tapaste and Santiago de las Vegas adults have the pale lateral margins well indicated, as is the case with the San Antonio de los Baños and Santiago de las Vegas immatures; that from Varadero and that from south of Pinar del Rio and a San Diego de los Baños female have the bars weakly marked, while the other adults and an immature female from San Diego de los Baños and another from Camoa have virtually no indication of them. The bicolored Cotorro male is noteworthy in having the medio-caudal portion of the pronotal disk and the greater portion of the metanotum solidly pale, while small lateral triangular blotches are indicated on the proximal abdominal tergites. This specimen is thoroughly hardened and its coloration had no doubt been fully fixed before its death. The Tapaste male, however, is teneral, and its coloration may not represent exactly what would have been retained in the thoroughly hardened adult. In this specimen the dark bars of the pronotum are broadly connected cephalad and narrowly so caudad; the enclosed light spot is brazil red, while the discoidal and anal areas of the tegmina are english red, with the medio-proximal section of the proximal tergites and most of the distal tarsal joint brazil red. These specimens, with indications seen in the immature individuals from Cotorro Camoa, Varadero, and Santiago de las Vegas, would seem to show that the dark marking was more primitively a bilineate pattern, its solidity being a feature of maximum development of the infuscate tendency.

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[1] Idem, p. 267.

[2] 1917, Mem. Amer. Entom. Soc., No. 2, pp. 166–170.

Immature material from Cotorro showing marked pale lateral borders represents five instars, and of these specimens quite a few exhibit a relatively paler central section of the disk, this being distinctly and broadly indicated in one of the youngest specimens with pale lateral bars.

It is quite possible that *opaca* is limited to the western portion of the island of Cuba, and that it is replaced in the central and eastern sections by the following species (*taurus*). All the previous exact records of the species are clearly from localities west of Oriente Province, except Gundlach's report of its occurrence at Santa Maria del Rosario, a locality which we have not been able to locate definitely, although it may be one of the two "Santa Marias" given for Cuba, both of which are in Oriente Province. Gundlach's record, if from the latter province, probably refers to *taurus*, here described. Rehn and Hebard individually have recorded the species from a number of localities in western Cuba, and it has also been recorded from Los Indios, Isle of Pines (as *finschiana*) by Holland and Kahl.[1]

Eurycotis taurus, new species

Plate XIV, Figures 5 to 8

Eurycotis opaca HEBARD, 1917, Mem. Amer. Entom. Soc., No. 2, p. 166, footnote 27I. (1n part not of Brunner, 1865.) ♀; Sancti Spiritus, Santa Clara Province, Cuba.

Eurycotis opaca HEBARD, 1917, idem, p. 267. ♀; Adventive at Orono, Maine.[2]

This species is a close relative of *E. opaca* Brunner, which it may replace in central and eastern Cuba. From *opaca* the present species differs in its somewhat greater size, more robust build, more decided punctulation of the surface in the male sex, the abdomen also semi-shagreenous, in the relatively shorter and more transverse tegmina, in the supra-anal plate of the male being strongly transverse, with its caudo-lateral angles produced laterad into recurved horn-like spines, the plate also strongly concave transversely, in the relatively longer caudal tibiæ, and in the character of the spiniform production of the seventh abdominal tergite. The development of the wings in the female individual we are describing as the allotype is, we feel certain, an unusual condition, although the Central American *E. quadri-squamata* Saussure and Zehntner[3] has distinct articulate wings as well as lateral tegmina developed in the female sex, the only one known of the species. We would prefer to consider the wing development of this allotypic female as atavistic, in view of the lack of such noticeable development in the otherwise typical females of the species before us.

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[1] 1916, Ann. Carneg. Mus., X, p. 541.

[2] At that time an immature male taken as an adventive at Rochester Mill, Pennsylvania, was also recorded as *opaca*. This specimen is not at present available for re-examination and its correct specific position in consequence not determinable. In 1917 but a single species of this group of the genus was known aside from the North American *floridana*.

[3] 1893, 'Biol. Cent.-Amer. Orth.,' I, pp. 70, 71, Pl. IV, fig. 40.

TYPE.—Male; Vicinity of Sama, Oriente Province, Cuba. (Taken from fruit steamer "Joseph C. Cuneo" at Philadelphia.) June 24, 1921. (Max Kisliuk.) [Hebard Collection, Type No. 823.]

Size large; form robust; surface impresso-punctulate, becoming finely acute spiculose and semi-shagreenous on dorsum of abdomen.

Head visible cephalad of pronotum for almost its entire width, as seen from dorsum; greatest width of head across eyes nearly equal to greatest depth of same, in outline almost circular; interocular space very broad, equal to that between antennal scrobes, distinctly broader than area between ocellar spots: eyes but faintly indicated in head outline; ventral point of eyes not extending ventrad of ventral margin of antennal scrobes; antennæ distinctly longer than body.

Pronotum semi-elliptical in outline, its greatest length contained about one and one-half times in greatest (caudal) width of same: cephalic margin moderately arcuate, passing by broadly arcuate cephalo-lateral angles into the broadly arcuate lateral sections; caudo-lateral angles narrowly rounded rectangulate; caudal margin subtruncate; all margins very narrowly cingulate: in transverse section the pronotum is distinctly arcuate; surface with a weakly elevated and smoother pair of large, subreniform areas, poorly outlined and median in position.

Tegmina transversely rectangulate, their length no greater than half of median length of pronotum, greatest length contained nearly one and two-thirds times in their greatest width: costal margin nearly straight, cingulate; distal margin subtruncate, weakly sinuate; sutural margin arcuate, more sharply so proximad, tegmina overlapping in distal half of this margin: surface with venation weakly indicated. Wings absent. Metanotum with caudo-lateral angles rectangulate; median section of caudal margin of metanotum hardly at all produced mesad.

Abdomen with tergites to seventh having caudo-lateral angles acute-produced, of seventh acute produced with an arcuate lamellation on internal face. Supra-anal plate strongly transverse, median length contained slightly more than three times in proximal width of same; from cercal insertion to caudo-lateral angles lateral margins are weakly concave, distinctly convergent; distal margin transverse, very weakly biarcuate with a very shallow median emargination, the margin and ventral surface of plate with numerous recurved shagreenous teeth directed toward median line of body; caudo-lateral angles of plate produced into laterad directed, recurved, spiniform hooks or horns; surface of plate transversely concave, distal section appreciably curved dorsad, this more pronounced laterad than mesad. Cerci relatively short, but little longer than supra-anal plate, subfusiform, moderately depressed. Subgenital plate of general type found in genus, median section with margin weakly arcuate, stylar sockets relatively deep; styles simple, tapering, acuminate. Genital hook relatively heavy, see Plate XIV, figure 7 for form.

Limbs robust. Cephalic femora with eleven spines on distal three-fourths of ventro-cephalic margin, distal spines of same margin three in number; ventro-caudal margin with four large spaced spines in distal half, one disto-apical in position. Median and caudal femora with ventral margins strongly spined. Caudal tibiæ one-fifth longer than femora, robust, subequal in width, not inflated, moderately depressed, as seen from extensor surface not at all fusiform or bullate, marginal and central carinulæ of that surface all subparallel. Caudal tarsi two-thirds as long as caudal tibiæ, metatarsus forming slightly less than one-half of tarsal length; pulvilli large; arolia large.

Allotype.—Female; Ojo de Agua de Filipinas, Oriente Province, Cuba. (C. T. Ramsden.) [Academy of Natural Sciences of Philadelphia.]

The present sex differs from the above description of the male in the following noteworthy respects.

Size very large. Head with interocular space slightly greater than that between antennal scrobes. Tegmina in general type similar to those of male, but with greatest length costal and contained one and one-third times in greatest proximal width; costal margin more arcuate distad than in male, disto-costal angle narrowly rounded rectangulate, reaching nearly as far caudad as caudal margin of metanotum; sutural margin equal to two-thirds of length of costal margin, much more gently arcuate than in male; distal margin moderately oblique, truncato-concave; surface with venation essentially as in male. (Wings present as lateral articulate pads, in width equal to nearly one-third that of tegmen, projecting distad of same by a small fraction of tegminal length.) Supra-anal plate with greatest length of plate contained nearly twice in proximal width of same, subtectate in transverse section distad, of same general shape as in *opaca*, but disto-lateral angles more declivent, lateral margins less sigmoid and medio-distal emargination nearly semicircular in shape. Subgenital plate with valves relatively longer and narrower when compared with those of *E. opaca*.

General color pitch-black, uniform and solid, with the following exceptions: ocellar spots, interior of antennal scrobes, pulvilli and usually most of coxæ, cream-color to ochraceous-buff, the coxæ generally washed proximad and mesad with ferruginous to kaiser brown in the male and with the general color in the female. In the female sex frequently there is distinctly, and in the male more obscurely, indicated a median to proximo-median blotch of rufous on the cephalic face of each coxæ. Clypeus and labrum dully tawny to ferruginous; mandibles hay's russet to brick red. Antennæ dark proximad, passing to ferruginous (♂) or hay's russet (♀) distad.

Measurements

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, *opaca*, Varadero, Cuba................	33.3	11	15.5	7	10 mm.
♂, *taurus*, type........	37	12.9	18.6	7.5	11.5
♀, *taurus*, Sancti Spiritus, Cuba, paratype..	41.8	12.9	18.2	8.4	12.2
♀, *taurus*, Ojo de Agua de Filipinas, Cuba, allotype...........	46[1]	13.9	19.6	10.7	13.5
♀, *taurus* Silla de Gibara, Cuba, paratype...	37.5	13.2	19.2	7.6	12.8

[1] Abdomen somewhat unnaturally distended.

In addition to the type and allotype we have before us two paratypic females, in the collections of the Academy of Natural Sciences of Philadelphia; one from Sancti Spiritus, Santa Clara Province, Cuba, taken April, 1904, by Dr. Henry A. Pilsbry; and the other from Silla de Gibara, Oriente Province, Cuba, taken by José Cabrera. The adventive female taken at Orono, Maine, mentioned above, has also been examined, as well as an immature female, in one of the later instars, bearing the same data as the type. This specimen is 30.5 millimeters long and exhibits a strongly contrasted coxal color pattern.

Eurycotis cribrosa,[1] new species

Plate XIV, Figure 9

This remarkable species needs comparison with no other. Its heavy, deep form, hard and deeply punctate integument and strikingly colored black body and yellow tegmina, which latter are lateral, immediately differentiate the species. In addition it is the only Cuban species which has the caudal metatarsal pulvillus covering the greater portion of the metatarsal length.

Type.—Male; Los Caños, Guantanamo, Oriente Province, Cuba. May 25, 1914. (C. T. Ramsden.) [Academy of Natural Sciences of Philadelphia, Type No. 5266.]

Size rather under medium; form elongate ovate, very robust, deep, subdepressed, dorsum convex transversely, abdomen broader than prothorax; surface moderately shining dorsad, there with pronotum sparsely impresso-punctate, this tendency increasing in density caudad, until on distal abdominal tergites and supra-anal plate the surface is strongly and closely cribrose; tegmina with surface distinctly impresso-punctate.

Head with occiput narrowly visible cephalad of pronotum when seen from dorsum, greatest depth of head subequal to width of head across eyes; occiput, with eyes, regularly and moderately arcuate; interspace between eyes slightly greater than that between antennal scrobes; face subdeplanate ventrad. Palpi relatively robust; third joint deeper than usual; fourth joint very faintly shorter than third joint, infundibuliform; fifth joint subequal in length to the third joint, ventral margin regularly arcuate. Antennæ subequal to body in length.

Pronotum transverse, greatest length contained one and one-half times in greatest width of same, semi-circular in outline: lateral and cephalic margins regularly arcuate, caudal margin truncate; latero-caudal angles rounded rectangulate; lateral margins distinctly but finely cingulate, caudal margin not distinctly cingulate: surface of pronotum regularly and decidedly arcuate in transverse section.

Tegmina lateral, subquadrate but appreciably transverse, interspace between tegmina slightly more than twice proximal width of a single tegmen, in length faintly if at all surpassing distal margin of mesonotum: costal margin weakly arcuate, cingulate; sutural margin more decidedly arcuate; distal margin weakly oblique, sub truncate; disto-costal angle rounded rectangulate; disto-sutural angle broadly rounded obtuse. Metanotum with distal margin broadly, very faintly and shallowly concave; lateral margins of metanotum arcuato-truncate, cingulate, disto-lateral angles rectangulate.

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[1] In allusion to the deep and regular pitting of the abdomen.

Abdomen broad, lateral margins of tergites cingulate; disto-lateral angles acute, progressively sublamellate distad. Antepenultimate abdominal tergite with its distal margin broadly and weakly sigmoid laterad and having a broad, shallow median emargination, as a whole weakly suggesting the development seen in females of the African genus *Deropeltis*. Supra-anal plate moderately transverse, lateral margins regularly converging, distinctly but not strongly bilobate distad, median emargination shallowly rounded obtuse-angulate; in transverse section plate is hardly tectate. Cerci very short, not more than two-thirds as long as supra-anal plate, very broad fusiform, apex acute but not produced, deplanate dorsad. Subgenital plate relatively small, distal margin nearly rectangulate in outline, in profile the apex of plate is subtruncate.

Limbs very robust, short, smooth. Cephalic femora with nine spines in the regular series on ventro-cephalic margin, the distal group of spines with the two more distad sharply differentiated and subequal in size, considerably larger than the more proximal one; ventro-caudal margin with four spines. Caudal tibiæ one and one-half times as long as caudal femora, broad, fusiform, strongly narrowing proximad, depressed; extensor face moderately deplanate, margins strongly carinate. Caudal tarsi about three-fifths as long as caudal tibiæ, appreciably compressed; caudal metatarsus slightly shorter than remaining tarsal joints; pulvillus of caudal metatarsus elongate, extending proximad in an acute prolongation, occupying three-fourths of ventral surface of metatarsus.

General color solidly fuscous-black. Tegmina apricot yellow, the punctations and the cingulate lateral margins of the general color. Eyes light drab to hair brown. Ocelli very minute, buffy.

Female (type).—Length of body, 23.8 mm.; length of pronotum, 6.7; greatest width of pronotum, 10.2; length of tegmen, 2.9; proximal width of tegmen, 3.4; length of caudal tibia, 7.2.

Female (paratype).—Length of body, 22 mm.; length of pronotum, 7; greatest width of pronotum, 11.1; length of tegmen, 3.5; proximal width of tegmen, 3.8; length of caudal tibia, 6.4.

In addition to the type we have before us a paratypic female bearing the same data as the type, and three very immature individuals taken at Baracoa, Oriente Province, Cuba, November, 1915, and from the collection of W. T. Davis. These latter specimens are quite small (10 to 12.5 mm. in length of body), represent two instars, and show, as clearly as could be expected in their immature condition, the structural characters of the adult. The pulvillus of the caudal metatarsus shows a very decided beginning of the elongation so pronounced in the adult. The particularly striking features of these individuals is in the coloration. This is solid black except that the pronotum has the cephalic and lateral margins continuously margined with ochraceous, on the cephalic margin rather narrowly so, on the lateral ones regularly broadening caudad, sharply oblique arcuato-truncate at the latero-caudal angles.

HENICOTYLE,[1] new genus

This new genus of the Blattinæ is made necessary by the peculiar characters of its genotypic, and at present, unique species, which was described by Brunner as *Stylopyga antillarum*, later referred by him to the genus *Eurycotis*.[2] Neither association is correct, as exhaustive comparisons show.

The genus is probably more nearly related to *Blatta* (i. e., *Stylopyga* of authors) and *Neostylopyga* Shelford, as represented by their genotypes, *Blatta orientalis* and *Neostylopyga rhombifolia*, than to any of the other genera of the subfamily. Its leading characters of difference from these genera are: the caudal tarsi are very slender and elongate, moderately compressed, with the metatarsus appreciably longer than remaining joints; fourth joint of the caudal tarsi is the only one bearing a pulvillus, this short and apical; the supra-anal plate of female is transverse, not produced, margin very faintly arcuate, not emarginate. In the form of the female supra-anal plate this genus has a unique position in the group of genera to which it clearly belongs, while in the allied genera we find no such tarsal development as in *Henicotyle*, the pulvillus features being equally unique. There is no real relationship to *Eurycotis*, *Lamproblatta* or *Pelmatosilpha*.

GENERIC DESCRIPTION.—Ovate, subdepressed, semi-apterous, surface glabrous. Eyes widely separated; antennæ elongate, setaceous. Pronotum transverse, subparabolic; caudal margin truncate; caudo-lateral angles rounded rectangulate. Tegmina reduced, lateral, sublanceolate; interspace of mesonotum separating tegmina broad, far surpassing tegminal width. Wings absent. Male unknown. Supra-anal plate of female short, strongly transverse, distal margin arcuate, unproduced, entire. Cerci large, fusiform. Subgenital plate of female with valves distinct, relatively small. Cephalic femora with ventro-cephalic margin bearing "Type A" spines; ventro-caudal margin spined. Tarsi slender, compressed; caudal tarsi four-fifths as long as caudal tibiæ; caudal metatarsus longer than remaining caudal tarsal joints: ventral surface of tarsal joints regularly biseriate spinulose; dorsal and lateral surfaces of all tarsi chaeto-spinulose; pulvillus present solely on fourth joint of all tarsi; arolia present.

GENOTYPE.—*Stylopyga antillarum* Brunner.

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[1] From *ἑνικο-τυλη*, i. e., single pad, in allusion to the single tarsal pulvillus.
[2] 1893, Proc. Zoöl. Soc. London, 1893, p. 603.

Hemicotyle antillarum (Brunner)

Plate XIV, Figure 10

S[tylopyga] antillarum Brunner, 1892, Proc. Zoöl. Soc. London, 1892, p. 204, Pl. xv, fig. 5. ♀; St. Vincent, West Indies.

Dominica.—Laudet, VI, 12, 1911, (Miner; from rotting wood and wood soil), 1♀.

The genus and species readily can be distinguished from the other members of the subfamily in the West Indies by the possession of a non-produced, non-emarginate transverse supra-anal plate in the female sex. The species is known only from the original description and the present record.

In size the specimen before us measures: length of body, 12 mm.; length of pronotum, 4; length of tegmen, 2.1; length of caudal tibia, 4.9.

We have figured the very interesting structure of the caudal tarsus of this genus and species.

Blatta orientalis Linnæus

[Blatta] orientalis Linnæus, 1758, 'Syst. Nat.,' 10th Ed., p. 424. America; the East; Russia; Stockholm, Sweden; Finland.

This domiciliary pest, which is virtually cosmopolitan in its distribution, has been definitely recorded from the West Indies in but three instances. These are: from Jamaica, by Sells in 1842; from Guadeloupe, by Lherminier in 1837; from the "Antilles" by Saussure and Zehntner in 1893. No material from the islands has been examined by the authors.

Periplaneta[1] **americana** (Linnæus)

[Blatta] americana Linnaæus, 1758, 'Syst. Nat.,' 10th Ed., p. 424. America.

Jamaica.—Kingston, St. Andrew Parish, X, 24, 1913, (M. Hebard; in hotel larder), 1♂, [Hebard Cln.].

Hispaniola.—Port-au-Prince, Haiti, 2♂, [Paris Museum]; XII, 22–31, 1921, I, 1–8, 15–23, 1922, II, 19–28, 1922, (F. E. Watson; chiefly at light), 3♂, 1♀, 2 immature individuals. Aux Cayes, Haiti, March 15–20, 1922, (F. E. Watson; in hotel), 1♀. Puerto Plata, Dominican Republic, V, 7–8, VII, 6, 1915, (F. E. Watson; in house and on steamer after leaving Puerto Plata), 1♂, 1♀. Sanchez, Dominican Republic, V, 17–21, 28–31, 1915, (F. E. Watson; in hotel), 3♂. Santo Domingo City, Dominican Republic, VII, 1920, (Marcus Farley), 1♂, [A. N. S. P.].

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[1] For the characters and relationship of the West Indian species of *Periplaneta* see Hebard, 1917, Mem. Amer. Entom. Soc., No. 2, pp. 14–15, 20, 177–191, Pl. vii, figs. 3–24.

MONA ISLAND.—Playa Sardinera, II, 21–26, 1914, (Lutz; at light), 1 ♀.

PORTO RICO.—Toa-Baja, Department of San Juan, 1915, (G. Garb), 2 ♂, 1 ♀. [Cornell Univ.]. Mayaguez, Department of Mayaguez, VI, 21–23, 1915, 1 ♂. Adjuntas, Department of Aguadilla, VI, 8–13, 1915, 1 ♀.

BARBUDA.—X, 21, 1911, 1 ♂, [A. N. S. P.].

This widely distributed and familiar domiciliary species has, in the past, been recorded from the following localities in the West Indies: Bahamas (Rehn); Cuba (Guérin, Bolivar and Gundlach); Nuevo Gerona, Isle of Pines (Rehn, Holland and Kahl); Los Indios, Isle of Pines (Holland and Kahl); San Domingo (Beauvois, Walker); Jamaica (Browne, Rehn); Porto Rico (Gundlach); Luquillo, Porto Rico (Rehn); St. Thomas, Virgin Islands (Shelford); Antigua (Stoner); Guadeloupe (Lherminier); Barbados (Rehn, Caudell). Gundlach considered the species to be noxious and annoying in Cuba, which is true of it in most of tropical America.

Periplaneta brunnea Burmeister

P[*eriplaneta*] *brunnea* BURMEISTER, 1838, 'Handb. der Entom.,' II, Abth. II, pt. 1, p. 503. Chile; Demerara.

CUBA.—Havana, 1 ♀, [Paris Museum]. Baños de Ciego Mantera, Santa Clara Province, V, 5, 1918, 1 ♂.

HISPANIOLA.—Port-au-Prince, Haiti, 2 ♂, 9 ♀, 7 immature specimens, [Paris Museum]. Sanchez, Dominican Republic, V, 11–16, 1915, (F. E. Watson; in hotel), 1 ♀.

JAMAICA.—Kingston, St. Andrew Parish, X, 24, 1913, (M. Hebard; in hotel larders), 1 ♂, 2 ♀, [Hebard Cln.]. Constant Spring, near Kingston, elevation about 650 feet, I, 4–24, 1920, (H. E. Machado), 1 ♂. Montego Bay, St. James Parish, X, 28, 1913, (M. Hebard; in kitchen), 1 ♀, [Hebard Cln.].

BARBADOS.—No exact locality, 1 ♀, [U. S. N. M.].

This species recently has been figured and discussed in detail by Hebard.[1] It is more restricted in its general range than *P. americana*, but occurs virtually throughout the tropics. The only previous records of the insect from the West Indies are those of its occurrence on Culebra Island[2] and Barbados,[3] while Sein,[4] without details, includes it as a Porto Rican insect.

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[1] 1917, Mem. Amer. Entom. Soc., No. 2, pp. 182–185, Pl. VII, figs. 12–16.
[2] Rehn, 1910, Bull. Amer. Mus. Nat. Hist., XXVIII, p. 75.
[3] Caudell, 1922, Univ. of Iowa Studies in Nat. Hist., X, No. 1, p. 22.
[4] 1923, Circ. No. 64, Dept. Agric. y Trabajo, Porto Rico, p. 6.

Periplaneta australasiæ (Fabricius)

[*Blatta*] *australasiæ* Fabricius, 1775, 'Syst. Entom.,' p. 271. "In nave e mare Pacifico et regionibus incognitis revertente."

Bahamas.—Nassau, New Providence, 1♂, [U. S. N. M.]; XI, 10, 1912, 1 immature (damaged).

Cuba.—Los Caños, Guantanamo, Oriente Province, V, 25, 1914, (C. T. Ramsden), 2 immature ♀, [A. N. S. P.].

Hispaniola.—La Moriniere, Haiti, III, 1–5, 1922, (F. E. Watson; at light), 1 immature ♀. Port-au-Prince, Haiti, I, 15–23, 1922, (F. E. Watson; at light), 1♀. Santiago [de los Caballeros], Province of Santiago, Dominican Republic, XI, 25, 1918, (H. B. Sherman), 1♂, [Mus. of Zoology, Univ. of Michigan]. Moca, Province of Espaillat, II, 22, 1922, (E. Kaempfer), 1♂, [A. N. S. P.]. Sanchez, Province of Samaná, Dominican Republic, V, 11–31, VI, 3–6, 1915, (F. E. Watson), 2♂, 1♀, 1 immature ♀.

Jamaica.—Kingston, St. Andrew Parish, II, 28, 1911, (Grossbeck), 1 very immature specimen: X, 24, 1913, (M. Hebard; in hotel larders), 2♂, 1 immature ♀, [Hebard Cln.]. Pleasant Hill, Blue Mountains, elevation 3660 feet, VII, 27, and 30, 1923, (Rehn; in house at night), 3♂, [A. N. S. P.]. Bath, St. Thomas Parish, elevation about 250 feet, I, 30–31, 1920, 1 immature individual. Stony Hill, St. Andrew Parish, X, 25, 1913, (M. Hebard), 1♂, [Hebard Cln.]. Grange Lane, St. Catherine Parish, X, 25, 1913, (M. Hebard; under bark of a dead tree), 1♀, 1 very immature specimen, [Hebard Cln.]. Montego Bay, St. James Parish, III, 14, 1911, (Grossbeck; under bases of leaves of cocoanut palms), 2♀; X, 28, 1913, (M. Hebard; in kitchen), 2♀, 1 immature ♀, [Hebard Cln.]. Mandeville, Manchester Parish, elevation 2100 feet, XI, 20, 26–28, 1919, I, 6–7, 1920, (F. E. Watson), 3♀.

Porto Rico.—Ensenada, Department of Aguadilla, VI, 14–19, 1915, (F. E. Lutz and A. J. Mutchler), 2♂, 3♀, 4 immature ♂, 4 immature ♀. Baños de Coamo, Department of Ponce, VI, 5–7, 1915, (Lutz and Mutchler; hotel porch), 1♂.

St. Kitts.—No exact locality, IX, 1914, 1♀, [A. N. S. P.].

Dominica.—Laudet, VI, 12, 1911, (Lutz), 1♀.

This circumtropical species is abundant throughout the West Indies. It is generally domiciliary, but it also occurs in various hiding places out-of-doors.

The West Indian records given by previous authors are as follows: Bahamas (Rehn); Cuba (Saussure, Walker, Bolivar and Gundlach); El Guama and San Diego de los Baños, Pinar del Rio Province, Cuba

(Rehn); Mandeville, Jamaica (Cockerell); Jamaica (Rehn); Porto Rico (Gundlach); Culebra Island (Rehn); St. Thomas, Virgin Islands (Girard); Loango, Virgin Islands (Shelford); Antigua (Stoner); Barbados (Rehn, Caudell); Grenada (Brunner).

One of the Sanchez males and all the Pleasant Hill males have the dark area of the pronotum very extensive, limiting the pale coloration to a narrow cephalic inter-marginal line and a broader caudal section, the lateral pale sections reduced to a mere point on each side, or even completely absent in one Pleasant Hill individual. This is even more decided than that described by Hebard as the maximum condition of this type.[1]

Nyctiborinæ

The Nyctiborinæ is a peculiarly tropical American group of cockroaches, many of the members of which possess a covering coat of short golden hairs or "pubescence." It includes some of the most beautifully marked members of the family, also many which are quite somberly colored. One of its genera (*Megaloblatta*) contains the largest known cockroaches, when the area of the organs of flight is considered. No species of the subfamily are found native north of the West Indies and north-central Mexico, while to the southward one species reaches central Argentina (Province of San Luis).

NYCTIBORA Burmeister

This genus, the dominant group of the subfamily, is found in all of the Greater Antilles except Cuba. It is represented by two groups, one composed of nearly or quite uniformly colored, pitch brown forms, with a distinct golden pubescence, of which three species are known from the islands; the other, comprising a single species of bicolored pattern and less marked pubescence, occurring in Hispaniola and Jamaica, is frequently transported in bananas to points in the eastern United States. The absence of the genus from Cuba is puzzling, as it is one of the markedly characteristic types of tropical American Blattidæ, widely distributed in South and Central America and occuring north to north-central Mexico.

KEY TO THE WEST INDIAN SPECIES OF *Nyctibora*

1. Coloration of dorsal surface uniform pitch brown, or at least not sharply contrasted. Lateral borders of pronotum and marginal field of tegmina without pronounced ochre yellow. Supra-anal plate of male with distal margin having two or three emarginations..2.

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[1] 1917, Mem. Amer. Entom. Soc., No. 2, p. 187, footnote 298.

Coloration of dorsal surface contrasted. Lateral borders of pronotum and marginal field of tegmina ochre yellow, sharply delimited from the general pitch brown color. Supra-anal plate of male trigonal, margin entire. (Size medium, length of body, ♂ 25.7 to 30.2, ♀ 23.8 to 26.4 mm.) [Hispaniola, Jamaica; Swan Island.]............................*lævigata* (Beauvois).

2. Supra-anal plate of male with medio-distal section of margin truncate or emarginate, flanked laterad by pronounced angulate emarginations..............3.

Supra-anal plate of male with medio-distal section of margin shallowly emarginate, without trace of flanking lateral angulate emarginations. [Hispaniola.] *stygia* Walker.

3. Size large (length of body, ♂ 33, ♀ 35 mm.). Tegmina and wings very ample. Pronotum proportionately smaller, with point of greatest width but slightly caudad of middle. Supra-anal plate of male with median section of distal margin arcuate-emarginate in addition to the paired emarginations laterad of median section; angles of flanking emarginations very obtuse. [Jamaica; Virgin Islands.]..*noctivaga* Rehn.

Size medium (length of body, ♀ 27.2, ♀ 32. 2 mm.). Tegmina and wings proportionately shorter. Pronotum proportionately larger, with point of greatest width at caudal third. Supra-anal plate of male with median section of distal margin truncate; angles laterad of flanking emarginations rectangulate. [Porto Rico.]..*lutzi*, new species.

Nyctibora noctivaga Rehn

Nyctibora noctivaga Rehn, 1903, Trans. Amer. Entom. Soc., XXIX, p. 3. ♀ (stated in error to be ♂); Machuca, Nicaragua.

This large, uniformly colored Central American species, which has been recorded from localities extending from southern Nicaragua to eastern Panama, apparently has been introduced into the West Indies. It was recorded as *N. mexicana* from Jamaica, without exact locality, by Rehn,[1] and as *noctivaga* by Shelford[2] from the island of Loango, near St. Thomas, Virgin Islands. The latter record, however, was based on an immature male individual, and in consequence the specific determination may be open to question. The Jamaican specimens, a male and a female now before us, are both adults, and inseparable from Central American representatives of the species. In size the Jamaican individuals are quite large, as has been shown by Hebard in discussing Panamanian material of the species.[3]

Hebard[4] has figured the characteristic supra-anal plate of the male of this species.

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[1] 1903, Trans. Amer. Entom. Soc., XXIX, p. 131.
[2] 1910, Zoolog. Jahrbüch., Suppl. XI, heft 2, p. 105.
[3] 1920, Mem. Amer. Entom. Soc., No. 4, p. 88.
[4] Idem, Pl. v, fig. 4.

Nyctibora lutzi, new species

Plate XVI, Figures 1 and 2

This species is a close relative of *N. brunnea* (Thunberg), from Brazil (for which see Plate XVI, figs. 3 and 4), of which Burmeister's *holosericea* is said by Shelford[1] to be a synonym. The latter author had the Thunberg material before him when the synonymy was established. Burmeister's insect was from Cameta, Brazil, which is at the mouth of the Rio Tocantins, and but a relatively short distance from Peixe Boi, near Pará, a locality represented by a male in the Academy series,[2] which we have here figured for comparison. We have other material of the same species group which will be discussed at a later date.

From *brunnea*, as represented by the Peixe Boi specimen, the type of *lutzi* differs in being more robust, the pronotum proportionately larger and broader, in the tegmina being shorter and broader, and in details of the male genitalia. The male supra-anal plate has the median process simpler and truncate, not developed as an emarginate structure with diverging lateral angles, while the accessory flanking angles are also less sharply angulate. The key given above under the generic heading will at once show the differential features as far as *noctivaga* is concerned.

Type.—Male; Ensenada, near Guanica, Department of Aguadilla, Porto Rico. June 14–19, 1915. (F. E. Lutz; in epiphytes with thin pencil-like leaves.) [American Museum of Natural History.]

Size medium (for the genus); form quite robust, actually shorter and broader than in *brunnea;* vestiture distinct and well indicated but not dense.

Head almost hidden under pronotum; interspace between eyes very narrow, not as broad as width of a single ocellar spot.

Pronotum proportionately large and broad, point of greatest width at caudal third, instead of slightly caudad of middle as in *brunnea*: cephalic section of pronotal margin narrowly arcuate, passing regularly into the diverging, weakly arcuate lateral sections of margin; caudal margin of pronotum faintly obtuse-angulate, nearly truncate, almost no caudo-lateral sections of margin differentiated from caudal margin itself; lateral angles rounded obtuse.

Tegmina relatively short and broad, surpassing apex of abdomen by no more than two-thirds of pronotal length, broad lanceolate, greatest width but faintly less than one-half of length: costal margin regularly arcuate; sutural margin nearly straight; distal section broadly rounded, apex more costal than sutural in position. Wings reaching to apices of tegmina when in repose: anterior field very broad, with apex markedly rounded; radiate field reduced in length and expanse, its length not more than three-fourths of anterior field.

Supra-anal plate (Plate XVI, fig. 1) broadly triangular, with its distal section bearing paired triangular emarginations, flanking laterad a transversely subrectangulate section of plate, which section has its free margin sinuato-truncate; angles laterad of paired emarginations subrectangulate; surface of plate thickly covered with numerous long erect chætiform hairs, producing a pompadour effect on dorsum of plate. Cerci broken. Subgenital plate simple, deplanate, moderately asymmetrical; sinistral stylar socket at normally exposed lateral angle of plate, large, thence the margin is strongly arcuate, yet weakly bilobate, to dextral stylar socket: which is smaller and situated some distance from dextral extreme of plate: sinistral style large, straight, simple, depresssed proximad, acuminate distad; dextral style about two-thirds as long as sinistral style, straight, proportionately stouter than sinistral, more fusiform.

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[1] 1908, Trans. Entom. Soc. London, 1907, p. 467.

[2] See Rehn, 1916, Trans. Amer. Entom. Soc., XLII, p. 236.

Limbs robust; femoral and tibial spines large. Caudal tarsi with metatarsus subequal to remaining tarsal joints in length.

Allotype.—Female; Utuado, Department of Arecibo, Porto Rico. January, 1899. (A. Busck.) [United States National Museum.]

The following features are of noteworthy difference from those of the male sex.

Tegmina surpassing apex of abdomen by nearly length of entire pronotum. Supra-anal plate sub-tectate, trigonal, lateral portions of margin straight convergent, distal extremity shallowly and narrowly concave. Cerci rather slender, tapering, surpassing apex of supra-anal plate, joints clearly indicated. Subgenital plate transverse, margin arcuate, medio-distal section of plate impressed.

General color very dark red-brown, in fact almost a blackish maroon, passing indefinitely to bay on the costal margin and more broadly on distal section of the tegmina. Venter with lateral sections of proximal abdominal segments, and indications on the femora and coxæ, chestnut. Ocellar spots buff-yellow. Antennæ of the general color proximad, mesad passing to brussels brown. Eyes raw umber. Dorsum of abdomen of male, meso- and metanotum burnt sienna, becoming chestnut mesodistad; supra-anal plate of male of general color. Vestiture of dorsum pale golden.

Male (type).—Length of body, 27.2 mm.; length of pronotum, 9; greatest width of pronotum, 12.5; length of tegmen, 24.8; greatest width of tegmen, 11.9.

Female (allotype).—Length of body, 32.2 mm.; length of pronotum, 10.2; greatest width of pronotum, 15.1; length of tegmen, 32; greatest width of tegmen, 13.8.

In addition to the type and allotype we have before us an immature male and an immature female, bearing the same data as the type.

This species is probably a native Porto Rican one, although there is always a possibility of it having been introduced from continental South America. We have, however, very carefully examined all the descriptions of forms of this genus from South and Central America, and can find nothing which would definitely, or even remotely, fit this species.

We take great pleasure in dedicating this species to our friend and colleague Dr. Frank E. Lutz, of The American Museum of Natural History, who has been so largely responsible for securing the collection of West Indian insects now owned by that great institution.

Nyctibora stygia Walker

Plate XV, Figures 1 to 13

Nyctibora stygia Walker, 1868, 'Catal. Blatt. Brit. Mus.,' p. 148. ♂; St. [Santo] Domingo; Honduras.

Hispaniola.—La Serre, Haiti, elevation about 125 feet, III, 3, 1922, (F. E. Watson; under loose dead bark of live "mesquite" tree), 2♂, 3♀, 47 immature individuals of both sexes. La Moriniere, Haiti, elevation about 125 feet, III, 1–5, 1922, (F. E. Watson), 1 immature individual. Port-au-Prince, Haiti, elevation about 300 feet, IV, 5–8, 1922, (W. F. Keeler), 1 immature individual. Maneville, Haiti, elevation about 60 feet, II, 6–10, 1922, (F. E. Watson; at light), 2♂, 2♀, 11 immature individuals.

Before the receipt of the above material the identity of this species had occasioned considerable uncertainty in our minds, and our first impression was that the species from Porto Rico, which we are here describing as *N. lutzi*, was the same as, or closely related to *stygia*. The present species was based on three specimens, two [*a* and *b*] from "St. Domingo" and one [*c*] from "Honduras." These were said to represent the male and female, the latter described as apterous, and from this evidently an immature individual. In an effort to secure some light on the matter an appeal for help was sent to Mr. B. Uvarov, of the Imperial Bureau of Entomology at London, and in due course of time a set of ink sketches of genitalic features of the Walkerian males in the British Museum was received. A request for additional information, accompanied by other sketches for comparison, brought a courteous note with definitely convincing information, showing the marked distinctness of *lutzi* and *stygia*.

Mr. Uvarov sent sketches of the supra-anal plates of the "*b*" male from "St. Domingo" and the "*c*" male from Honduras, from which we presume the "*a*" specimen is the immature individual considered a female by Walker. His sketches show a roughly triangular supra-anal plate with the distal extremity more or less broadly, but rather shallowly, concave, the lateral lobules thereby produced being very broadly rounded, which is exactly what we find in the above recorded Haitian series. Whether the Honduras specimen in its ultimate refinement will prove to be identical with the "St. Domingo" individual remains to be determined, as the sketches by Mr. Uvarov show the distal section of the plate broader and less markedly concave in the Honduras male than in that from "St. Domingo." The two specimens, however, are of the same type, and the differences shown may have no real significance, as intimated by the present Haitian series. To clarify the situation if specific difference should be found, we here restrict the name *stygia* to the "St. Domingo" male.

The most conclusive difference we find in the present species is in the form of the supra-anal plate, which is not closely approached in any other species known to us. Saussure and Zehntner's *azteca* we know solely from the female sex, but this plate in the male is described as "trapezino-rotundata," while the lack of appreciable pale pronotal markings in *azteca*, as well as the small size of the male given by the describers, would remove it from consideration. *Azteca*, the very different and reduced tegmined *tetrasticta* and the quite distinct, strongly bicolored and smooth *lævigata* agree with *stygia* in having the pulvillus of the caudal metatarsus elongate and equal to one-half of the metatarsal length. There can be no confusion of *stygia* with the very obviously and sharply yellow-bordered forms, such as *sericea* and *lævigata*, the smaller, more slender and more glabrous *glabra*, or the abbreviate tegmined *tetrasticta*.

In general appearance the present species has more resemblance to *N. brunnea* (Thunberg), as we understand it from eastern Brazil, than it has to any other species we have seen. Aside from the genital features *stygia* has a proportionately shorter and broader general form, due chiefly to the shorter tegmina; in the male sex the occipital interocular width is equal to about two-fifths of occipital depth of eye, instead of the eyes being subcontiguous as in *brunnea;* pulvillus of caudal metatarsus is elongate, extending as a long slender prolongation more than half-way to the base of the metatarsus, instead of subtrigonal and less than a third as long as the metatarsus, as in *brunnea;* the pronotum has distinct but not sharply delimited patches of vinaceous-rufous along the lateral margins cephalad of lateral angles, instead of being unicolorous as in *brunnea*.

Representative material of the present species measures as follows:

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Greatest Length of Tegmen	Greatest Width of Tegmen
♂, Maneville, Haiti...	24.4	7.2	10.1	23.2	10 mm.
♂, La Serre, Haiti.....	27.5	8	10.5	24.6	10.6
♀, La Serre, Haiti.....	29	8.2	11.5	25.5	10.6
♀, La Serre, Haiti.....	32.5	8.7	12.2	27	13

The immature material from La Serre alone represents all the instars except the first. As these specimens were taken the same day they demonstrate that the occurrence of the species as adult extends over at least a large part of the year.

The distinctness of this species from the strikingly colored and formed *lævigata* of the same island and of Jamaica, and from the Porto Rican *lutzi*, shows that at least three phyla of the genus are represented in the West Indies. As to what is really the nearest relative of *stygia* we cannot hazard a suggestion at this time. Our knowledge of the South American forms is still too fragmentary to warrant any attempt to group the species of the genus, although we have carefully analyzed our material representing eleven species of *Nyctibora*.

Nyctibora lævigata (Beauvois)

Plate XVI, Figure 5

[*Blatta*] *ægyptiaca* DRURY, 1773, 'Ill. Nat. Hist. Exot. Ins.,' II, p. 67, Pl. XXXVI, fig. 3. ♀; Jamaica. (Not of Linnæus, 1758.)

Blatta lævigata BEAUVOIS, 1805, 'Ins. Rec. Afr. et Amér.,' p. 228, Orth. Pl. IIC, fig. 4. Sex?; "Saint Domingue."

JAMAICA.—Palm Beach, Montego Bay, III, 3, 1911, (Grossbeck; under stones), 1♀. Montego Bay, X, 29 and XI, 3, 1913, (M. Hebard; from bromeliads), 3♂, 1♀, [Hebard Cln.]. Liguanea Plain, near Kingston, VII, 5, 1920, (R. & H; in cracks of dead stump of a mimosaceous tree), 3♂, 1 juv. ♂, [Hebard Cln. and A. N. S. P.]. "Port Antonio," (taken from banana steamer "Annetta" at Philadelphia, XII, 6, 1921; C. A. Davis), 1♂, 1♀, [Hebard Cln.]. Jamaica [no further data], 1♂, [A. N. S. P.].

SWAN ISLAND.—IV, 17, 1913, (George Nelson), 1♀, [M. C. Z.].

This beautiful and peculiarly West Indian species has had a rather checkered career in taxonomic literature. Although the first species of this genus made known to the scientific world, it remained one of the least known forms until a few years ago. This condition existed in spite of the fact that two clearly recognizable figures of the insect had been published by the year 1805. First reported and figured from Jamaica by Drury, in 1773, and named, described and figured by Beauvois from Hispaniola over a century ago, the name *lævigata* generally has been considered a synonym of the South American *N. sericea* Burmeister, and the localities of both Drury and Beauvois either assumed to be incorrect or ignored. The present authors placed the matter in its proper light some years ago,[1] and there showed *lævigata* to be a distinct and endemic West Indian species, related to *N. sericea*.[2] Its nearest relative, however, is a species from southeastern Brazil, *N. fictor* Rehn, which has recently been described.

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[1] 1914, Entom. News, XXV, p. 121–123.

[2] We must retain this specific name instead of the older *limbata* Thunberg (1826), which is preoccupied by *Blatta limbata* Charpentier (1825).

From *fictor*, *lævigata* at once can be separated by the marginal field of the tegmina being as pale as the lateral and cephalic borders of the pronotum, by the pronotal form being less truly trigonal, and the supra-anal plate of the male transverse trigonal instead of trapezoidal in general outline. With *sericea* these species form a natural group of the bicolored forms of the genus. Burmeister's *sericea* probably will be found to have a very extensive synonymy, as a number of names have been based on apparently specifically identical insects. The much shorter tegmina and wings, heavier pronotum, richer coloration with sericeous "bloom" much sparser and far less evident, and the form of the supra-anal plate of the male will at once distinguish *lævigata* from *sericea*.

The female individual from Montego Bay has a large oötheca protruding from the anal orifice. This is carried with the carina dorsad.

From the series before us it is evident there is, at times, considerable variation in the length of the organs of flight. All of the Jamaican specimens except two, and the Swan Island female, agree in having the tegmina and wings of the same short and broad type, in length less than three times as long as the pronotum. The Jamaican male specimen without exact locality, and the female from "Port Antonio," however, more resemble the South American *N. limbata* in their general outline, as the tegmina are equal to (♀) or slightly more than (♂) three times as long as the pronotum.

MEASUREMENTS OF REPRESENTATIVE INDIVIDUALS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Montego Bay, Jamaica	25.7	8.1	11.5	19.6	9.4 mm.
♂, Montego Bay, Jamaica	26.3	8.6	12.5	22	10
♂, "Jamaica"	30.2	8.6	12.2	27.5	11.7
♀, Palm Beach, Montego Bay, Jamaica	26.4	8.3	12.2	20.2	10
♀, Montego Bay, Jamaica	25.8	9	13.4	22	10
♀, "Port Antonio," Jamaica	30.4	9	13.1	27.5	12.2
♀, Swan Island	23.8	8.5	13.2	22.8	10.6

The coloration is uniform in the series, except that in certain specimens the femora and coxæ show more maroon to garnet brown than in others, where the general pitch black ventral color is more solid. The immature individual from the Liguanea Plain, which is in the instar preceding maturity, has the pronotum with a marked lateral and cephalic dull ochraceous-orange border, narrower proportionately than in the adult, and without indication on the mesothoracic lateral margins.

The species is known only from the records given here, the "Jamaica" records of Drury and Walker,[1] the Hispaniola record of Beauvois, and the records of adventives in the eastern United States and Canada given by Rehn and Hebard, Blatchley and Morse. Its occurrence on Swan Island is probably due to accidental introduction from Jamaica. In the latter island it would appear to be well distributed, at least at lower levels, frequenting a variety of suitable hiding places. There it probably occurs adult throughout the year, as our specimens represent early March, July, October and early November.

Pseudischnoptera lineata (Olivier)

Blatta lineata OLIVIER, 1789, 'Encycl. Méthod., Ins.,' IV, p. 317. Sex?; unknown locality.

This species, which has been reported a number of times from Cayenne, was recorded from the Antilles, without further specification, by Saussure.[2] No additional information on its occurrence in the West Indies is available, and in our opinion it is a Guianan insect, and has no part in the West Indian fauna. The insect is strikingly marked with a pair of longitudinal lines on each tegmina (one costal and a shorter median one), and a similar cephalic and lateral pronotal border, on a brownish black ground. The sole figure of the insect which has been published is that given by Beauvois,[3] which, even in spite of its lack of detail, is sufficiently accurate to enable one readily to recognize the species. Hebard has recently shown that *Pseudischnoptera* is a member of the Nyctiborinæ,[4] and not of the Pseudomopinæ, as generally placed.

EPILAMPRINÆ

The Epilamprinæ comprises a very considerable assemblage of genera and species of cockroaches, all tropical or subtropical in distribution and present in both hemispheres. Many peculiar structural modifications are present in the group; the sexes of the same species are frequently very dissimilar, and certain forms are aquatic for at least a portion of their lives. The subfamily is an extremely difficult one to study, as the limitations of a number of the genera are not clearly understood, and the marked sexual dimorphism frequently found adds greatly to the problems encountered. In America the center of maximum differentiation of the group is probably Brazil, and very possibly that portion south of the Amazon, while in the Old World the Oriental region contains the greatest generic and specific diversification of the subfamily.

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[1] As *N. druryi* Serville (1868, Catal. Blatt. Brit. Mus., p. 147).
[2] 1870, Miss. Sci. Mexiq., Rech. Zool., VI, p. 67.
[3] 1805, 'Ins. Rec. Afr. et Amér., Orth. Pl. IIC, fig. 5.
[4] 1921, Proc. Acad. Nat. Sci. Phila., 1921, p. 205.

But few of the members of this group are domiciliary or liable to be transported by commerce, except in fruit. The genus *Leurolestes* is the only member of the subfamily found in the West Indies which can be considered domiciliary.

KEY TO GENERA OF WEST INDIAN EPILAMPRINÆ

1. Caudal metatarsus markedly shorter than remaining tarsal joints (not more than three-fourths as long); ventral margins of same non-spinulose..........2.
   Caudal metatarsus longer than, subequal to, or but faintly shorter than remaining tarsal joints; ventral margins of same spinulose........................3.
2. Form patelliform. Pronotum strongly transverse, resembling that of genus *Paratropes*. Tegmina very broad, acute, corneous, without clearly marked anal sulcus or definite humeral trunk on dorsal surface. Tarsal claws equal.
   Phoraspis Serville.
   Form acute elliptical, less elevated and not patelliform. Pronotum less strongly transverse, epilamproid in type. Tegmina of more normal blattoid type, less acute, coriaceous, with clearly marked anal sulcus and definite humeral trunk on dorsal surface. Tarsal claws appreciably unequal.
   Notolampra Saussure.
3. Sexes without marked difference in development of tegmina, these complete, quadrate or subquadrate..4.
   Sexes with marked difference in development of tegmina. Males (unknown in *Epilampra cubensis*) fully alate..6.
4. Form markedly deplanate. Pronotum with disk distinctly differentiated from deflexed lateral portions; caudal margin arcuato-truncate, not produced mesad. Median and caudal femora with few and very short spines on each ventral margin..........................*Leurolestes* Rehn and Hebard.
   Form not markedly deplanate, generally appreciably convex in dorsal transverse section. Pronotum with disk little, if at all, differentiated from lateral portions, transverse section usually arcuate; caudal margin always produced mesad to same degree. Median and caudal femora with large and regularly placed spines on each ventral margin....................... 5
5. Tegmina abbreviate, quadrate or subquadrate, no longer than pronotum, leaving most of abdomen exposed (in West Indian species). (General form strongly arcuate in transverse section. Anal sulcus of tegmina barely indicated.)
   Audreia Shelford.

Tegmina and wings fully developed, nearly or quite equalling or surpassing apex of abdomen. (General form of more usual alate blattoid type; pronotum with production of caudal margin distinctly or markedly evident.) [See also section 6 of this key.] . . . . *Epilampra* Burmeister.

6. Female sex with tegmina longer than pronotum, reaching to middle of abdomen. with marginal field very broad. Male sex unknown. (Region of anal sulcus of tegmina lined with black.) . . . . *Epilampra cubensis* Bolivar,

Female sex with tegmina reduced to lateral subtrigonal slips, widely separated. shorter than pronotum and not reaching base of abdomen. Wings absent. Male sex fully alate . . . . 7.

7. Cephalic femora with ventro-caudal margin bearing three or more spines in addition to distal one. Male with pronotum large, distinctly cucullate; face with inter-ocular-ocellar region excavate. Female deplanate, strongly rugulose, with an evident elevated dorsal medio-longitudinal carinulation; pronotum strongly cucullate, projecting cephalad of and completely covering head . . . . *Homalopteryx* Brunner.

Cephalic femora with ventro-caudal margin having at most but a single spine in addition to distal one. Male with pronotum of normal epilamproid type, not at all cucullate; face not excavate. Female arcuate in transverse section to but weakly deplanate (*irrorata*), smooth and moderately polished, non-carinulate; pronotum hardly cucullate, not projecting cephalad of and nor completely covering head . . . . *Calolampra* Saussure.

PHORASPIS Serville

This genus is composed of nearly a score of species of rather small, strongly convex blattids, which have a marked superficial resemblance to beetles of the cassidid section of the Chrysomelidæ, but are of larger size. The species are known from eastern South America and from Central America as far north as central Mexico. Two have been recorded from the West Indies, but we feel that in at least one of these cases (*atomaria*) this was done in error.

Phoraspis atomaria Blanchard

Phoraspis atomaria BLANCHARD, 1837, Annal. Soc. Entom. France, VI, p. 287, Pl. x, figs. 2 and 2*a*. Sex?; Guadeloupe.

No student has recorded *atomaria* from the West Indies since the original description, while it has been reported from "Brazil" by Brunner. It is a much more rufescent insect than *pantherina*, with its pattern a minute stippling of fuscous, without decided maculations.

Phoraspis pantherina Blanchard

Phoraspis pantherina BLANCHARD, 1837, Annal. Soc. Entom. France, VI, p. 292, Pl. XI, figs. 3 and 3*a*. Sex ?; "Saint Domingue."

No additional information is available concerning this species in the West Indies. Saussure[1] by inference credits it to Guadeloupe, by using the words "Même patrie" for *pantherina* following a description of *atomaria*, but this is probably a lapsus calami. Like *atomaria* this insect has also been recorded from "Brazil." In general coloration it is more ochraceous than *atomaria*, with a tegminal pattern of distinct and irregularly distributed small black specklings, far coarser than the minute stippling of *atomaria*.

NOTOLAMPRA Saussure

The present genus is made up of three species of a more elongate type than those of *Phoraspis*, although the dorsal surface is markedly convex. The assemblage is one of those marking the transition from the more normal epilamprine type to that of the specialized phoraspid offshoot of the subfamily. Of the three species of the genus, two (*gibba* and *punctata*) are known only from Brazil, while the third is the apparently peculiar West Indian *antillarum*.

Notolampra antillarum Shelford

Notolampra antillarum SHELFORD, 1907, Annals and Mag. Nat. Hist., (7) XIX, p. 38. ♀; Trinité, Martinique.

All the information we possess regarding this species is contained in the original description, and nothing is recorded concerning its habits. Shelford considers it is more nearly related to *punctata* than it is to *N. gibba*.

LEUROLESTES Rehn and Hebard

The genus *Leurolestes* is composed of two species of very similar appearance, of depressed form, relatively smooth surface, fully winged in both sexes, and distinctly margined laterad on the pronotum, tegmina and abdomen with pale color.

Both species are largely domiciliary and readily transported by commerce, so that their present day distribution may have been largely brought about through the indirect agency of man. There is a strong probability the genus is a native of the West Indies, and that it has been transported eastward to the Canary and Madeira Islands, westward to Central America and northward to Florida. Its presence in Brazil can readily be explained by transportation from the Madeira Islands, which were and are regularly visited by ships trading between European ports and Brazil, particularly southern Brazil.

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[1] 1864, Mém. Hist. Nat. Mexiq., III, p. 144.

Leurolestes pallidus (Brunner)

N[*auphoeta*] *pallida* Brunner, 1865, 'Nouv. Syst. Blatt.,' p. 286. ♂; Cuba.

Cuba.—Varadero, north coast, Matanzas Province, (J. W. Ross), 1 ♀, [A. N. S. P.]. Baracoa, Oriente, II, 5, 1915, 1 ♀, [Davis Cln.].

Jamaica.—Montego Bay, (S. Brown), 1 ♀, [A. N. S. P.]. No exact locality, (S. Brown), 1 ♂, [A. N. S. P.].

Porto Rico.—Vieques Island, II, 1899, 1 ♂, [U. S. N. M.].

Montserrat.—No exact locality, (H. G. Hubbard), 1 ♂, [U. S. N. M.].

Dominica.—Laudet, VI, 11–13, 1911, (Lutz and Miner), 2 ♂, 3 ♀, 1 immat. indiv.

This striking species has been recorded from Cuba by numerous authors from the days of Serville down to the present, usually under the erroneous names of *Blatta lævigata* or *Phœtalia lævigata*.[1] Gundlach[2] states it lives over all that island, in houses, under lockers, boards, etc. From Hispaniola it was recorded first by Saussure; from Porto Rico at Utuado by Rehn,[3] and from Martinique by Serville. The present records are the first from Jamaica, Montserrat and Dominica.

Outside of the West Indies the species is known from southern Florida (Key West and Key Largo), Central America (Mexico, Guatemala), Brazil and the Canary Islands (Teneriffe). There appears every probability that its presence in Florida, Central America, Brazil and the Canaries is due to accidental introduction from the West Indies, which we feel are the original home of the species. From our knowledge of its occurrence at Key West, Florida, where it was found among old burlap bags in a fruit store, its accidental transportation is easily understood.

For a full description of the species, and figures of the same, see Hebard's 'The Blattidæ of North America.'[4]

Leurolestes circumvagans (Burmeister)

N[*auphoeta*] *circumvagans* Burmeister, 1838, Handb. der Entom., II, Abth. II, pt. 1, p. 508. Santa Catherina, Brazil; Teneriffe, Canary Islands; around the world in ships.

The present species is closely related to *L. pallidus*, differing in certain features of the coloration, particularly the uniform width of the pale borders of the pronotum, and also in the more nearly approximate eyes. It is known in the West Indies from Hispaniola (whence Brunner recorded it in 1865 as *lævigata*) and Grenada (reported by Brunner in 1893 as *lævigata*). Elsewhere it has been taken in southern Brazil (Santa Catherina), in the Canary Islands (Teneriffe) and the Madeira Group, as well as from ships voyaging around the world, hence the specific name. Although our evidence as to its distribution in the Antilles is very incomplete and unsatisfactory, we believe its original home was Antillean, the same as *L. pallidus*.

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[1] *Blatta lævigata* Beauvois which is usually cited for this species is, instead, a West Indian *Nyctibora*. See above and Rehn and Hebard, 1914, Entom. News, XXV, pp. 216–217.

[2] 1890, Contrib. Entom. Cubana, IV, p. 316.

[3] 1910, Bull. Amer. Mus. Nat. Hist., XXVIII, p. 73.

[4] 1917, Mem. Amer. Entom. Soc., No. 2, pp. 160–163, Pl. vi, figs. 9–10.

Brunner[1] reported this species as the *lævigata* of authors, which latter he described as *pallida*. This accounts for his record references given above as *lævigata*. The figure given by him shows the leading features of the species.

AUDREIA Shelford

The genus *Audreia* is composed of a small number of species described from the tropics and subtropics of both hemispheres, the majority, however, tropical American. The species much resemble certain forms referred to the genus *Epilampra*, but all possess reduced or subquadrate tegmina in both sexes, these subquadrate or distally emarginate in most of the forms.

Audreia has been discussed by Hebard in his 'Blattidæ of Panama,'[2] and we are not in a position at this time to go more into detail regarding its relationship to *Epilampra*. Until the genus *Epilampra* as a whole is critically studied, and our knowledge of the extent to which brachypterism occurs in that assemblage is more complete, it is unwise to do other than follow Shelford's use of the generic name *Audreia*.[3] We can say, however, that the genus *Calolampra*, to which a number of the species now placed in the more recently described *Audreia* were originally referred, is well distinct from *Audreia* of Shelford.

The West Indies possess two species which can logically be assigned to *Audreia*, one from the higher mountains of eastern Cuba, the other from the Blue Mountains of Jamaica. The possibility that these may be members of an ancient relict fauna forces itself upon one, although the converse argument that tegminal reduction has been brought about by adjustment to a peculiar and restricted montane environment cannot be ignored.

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[1] 1865, 'Nouv. Syst. Blatt.,' p. 285, Pl. VII, fig. 33.
[2] 1920, Mem. Amer. Entom. Soc., No. 4, pp. 92–93.
[3] 1910, 'Genera Insectorum, Orth., Blatt., Epilampr.,' p. 11.

KEY TO WEST INDIAN SPECIES OF *Audreia*

Size larger (length of body, ♂, 19 mm.; ♀, 21.5). Pronotum markedly vaulted, appreciably embracing head. Tegmina with distal margin markedly oblique concave-emarginate, sutural margin distinctly shorter than costal margin (not or but little more than half as long). Abdomen with caudo-lateral angles of distal tergites very weakly produced caudad, not spiniform. Palpi more slender, with ultimate and penultimate joints virtually subequal. (Cuba.). . *hamiltoni* (Rehn).

Size smaller (length of body, ♂, 13.6 mm.; ♀, 18–18.6). Pronotum more deplanate, in male not at all, and in female but weakly, embracing head. Tegmina more quadrate, distal margin far less oblique, more nearly transverse in direction, sutural margin but little shorter than costal margin (four-fifths as long). Abdomen with caudo-lateral angles of distal tergites distinctly spiniform produced caudad, very decided in male sex. Palpi more robust, with penultimate joint but two-thirds as long as ultimate one. (Jamaica.). . . . .*jamaicana,* new species.

Audreia hamiltoni (Rehn)

Plate XV, Figures 8 to 10

Calolampra hamiltoni REHN, 1903, Trans. Amer. Entom. Soc., XXIX, p. 274. ♀; Torquino Peak, Oriente, Cuba, elevation 5800 feet.

The original material of this most interesting Cuban species is now before the authors. The specimen mentioned in the comments of the original description as being very light in color, with the well-marked lyrate pronotal markings, is an adult male, and not a female as there stated. This individual is the only one of the sex known, its noteworthy differences from the female sex being as follows.

Eyes slightly deeper, ventral section slightly more elongate. Supra-anal plate of same form as in female, but with scabrosities of surface of distal section fewer, more regular and more distinct and elevated, distal margin hardly emarginate mesad. Cerci broken. Subgenital plate relatively large, moderately transverse, free margin in general arcuate but weakly asymmetrical; styles very slender, weakly decurved, dextral twice as long as sinistral, dextral style inserted at middle of dextral side of margin, sinistral slightly more distal in relative position, dextral placed in a shallow emargination of the margin, sinistral in an intermarginal depression which does not affect the marginal outline.

Male.—Length of body, 19.2 mm.; length of pronotum, 5.5; greatest width of pronotum, 7.9; length of tegmen, 5; greatest width of tegmen, 5.

The species *hamiltoni* is clearly congeneric with *carinulata* (Saussure) of Central America, the genotype, as selected by Hebard,[1] although it has a number of features of difference. The key given above contains the chief features of difference from the Jamaican species here described.

Nothing is known regarding the occurrence or distribution of this species other than that contained in the original description.

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[1] *Vide supra.*

Audreia jamaicana new species

Plate XV, Figures 4 to 7

Compared with the Cuban *A. hamiltoni*, the present species is readily separated in both sexes by its smaller size, more deplanate pronotum, which also has the caudo-lateral angles less produced, the more quadrate tegmina, the sutural margin of which is distinctly longer proportionately than in *hamiltoni*, the more deplanate dorsum of the abdomen, the more produced and spiniform caudo-lateral angles of the abdominal tergites, and the more robust palpi, the penultimate joint of which is but two-thirds as long as the ultimate one, instead of these being nearly subequal as in *hamiltoni*. The supra-anal plate of the male is differently sculptured and the subgenital plate of the same sex more trigonal produced than in *hamiltoni*.

When compared with *A. carinulata* (Saussure), the genotype, of which a female from Tablazo, Costa Rica is before us, the present species is seen to differ chiefly in the shape of the tegmina, particularly of the distal and sutural margins, in the more evident venation of the same, the spiniform angles of the abdominal tergites, the longer cerci and in details of the coloration.

Type.—Male; between Pleasant Hill and St. Helens Gap, Blue Mountains, Jamaica. Elevation, 4650 feet, July 24, 1923. (Rehn; from epiphytic bromeliad in open mountain forest.) [Academy of Natural Sciences of Philadelphia, Type No. 5421.]

Size relatively small; form elliptical, moderately depressed, dorsum of abdomen appreciably deplanate; surface of abdomen and limbs polished, of head, pronotum and tegmina dully polished.

Head short and broad, greatest width across eyes subequal to depth of same, broadly sub-cordiform in outline; occipital interspace between eyes very broad, slightly greater than half of entire width of head across eyes, faintly broader than that between antennal scrobes. Palpi with ultimate joint sublanceolate when seen in lateral aspect, greatest depth contained two and one-half times in greatest length, apex acute; penultimate joint about two-thirds as long as ultimate joint, broadly infundibuliform, its depth at apex little less than greatest depth of ultimate joint, appreciably arcuate at proximal extremity.

Pronotum nearly semicircular in outline, greatest length contained faintly more than one and one-half times in greatest (caudal) width of same: lateral and cephalic margins regularly, strongly and uniformly arcuate except for a slight supra-cephalic flattening; caudal margin transverse, truncate laterad, very weakly and very bluntly obtuse-angulate produced mesad; caudo-lateral angles very narrowly rounded rect-angulate: in transverse section the pronotum is moderately arcuate, weakly flattened mesad for the greater portion of its width, disk bearing mesad a pair of closely placed subcircular depressions.

Tegmina in general form subquadrate, slightly longer than broad, their length faintly greater than that of pronotum, attingent and faintly overlapping mesad, apices reaching to lateral bases of second tergite, greatest length at lateral third, point of greatest width at distal third: costal margin but briefly longer than sutural margin, passing from nearly straight proximad to strongly arcuate in distal half; sutural margin very faintly arcuate; distal margin weakly oblique, nearly subtruncate, shallowly concave; disto-sutural angle rounded rectangulate; disto-costal angle broadly rounded and constituting tegminal apex: venation well indicated, weakly elevated; marginal field broad, constituting slightly more than one-third of tegminal width at proximal fourth of tegmen, less defined distad; anal field without marked delimiting anal sulcus, but form and shape evident, large, comprising half of tegminal width and five-sixths of length along sutural margin. Wings rudimentary, completely hidden under tegmina.

Abdomen with caudo-lateral margins of tergites acute and produced caudad, becoming spiniform distad; surface of tergites with regularly disposed type of longitudinal welt-like ridges on distal half of each segment, as usual in many epilamprine forms, remainder of same surface with many small papilliform elevations. Supra-anal plate semicircular in outline with a shallow median V-emargination; surface of plate largely concave. Cerci robust, tapering, apex narrowed, extending caudad to faintly distad of margin of supra-anal plate, subdeplanate. Subgenital plate not extending caudad of supra-anal plate, asymmetrical, free margins roughly arcuate, in general rounding from sinistral base to a point dextrad of middle of plate, but with several flattenings of the general arcuation, from above mentioned point to base of dextral style margin is obliquely subtruncate, thence obliquely truncate to dextral base; styles simple, styliform and subequal except that dextral is faintly the longer, both failing to reach as far distad as extremity of subgenital plate.

Limbs as a whole relatively short and robust, ventral margins of femora strongly spined. Cephalic femora with ventro-cephalic margin with three to four large proximal spines, succeeded by a series of rather sparse, short spinules and the distal group of two spines of very unequal size, distal more than twice as long as other. Caudal tarsi with metatarsus slightly longer than remaining tarsal joints together, biseriately spinulose ventrad; pulvilli present on all joints; arolia well developed.

ALLOTYPE.—Female; same data as type. [Academy of Natural Sciences of Philadelphia.]

Agreeing with the above description of the male sex (type) except in the following noteworthy respects.

Size larger (i. e., larger than *carinulata* and smaller than *hamiltoni* and *gatunæ*); form less depressed; less contrast in surface polish of pronotum, tegmina and dorsum of abdomen.

Pronotum with greatest length contained slightly less than one and one-half times in greatest (caudal) width of same: disk of pronotum with a few scattered, paired punctiform indentations.

Tegmina with length faintly less than greatest width (or subequal as in paratypic female): costal margin straighter, less arcuate distad but apex as fully rounded and as pronounced as in male: anal field no more decided than in male but clearly traceable distad as far as disto-sutural angle.

Surface of abdominal tergites with welt-like ridges somewhat less pronounced, remainder of surface with papilliform elevations less evident, these largely represented by coloration features. Supra-anal plate with surface much less excavate than in male. Cerci not quite reaching as far distad as apex of supra-anal plate. Subgenital plate with portion of margin between infra-cercal emarginations broadly arcuate, entire, failing to reach as far caudad as supra-anal plate; infra-cercal emarginations shallow but distinctly marked.

Underlying base color cinnamon-buff (females) to pinkish cinnamon (male), overlaid, very heavily and quite solidly in the male, less solidly and more of the usual atomaceous epilamprine character in the female, with a pattern of blackish fuscous and walnut brown. Face solidly blackish fuscous from occipital interspace to middle of clypeus; dorsum of occiput pale with a variable amount of dark stippling; eyes tawny to russet; antennæ dresden brown to prout's brown. Pronotum in male with disk rather solidly blackish fuscous, laterad and cephalad the dark pattern weaker and sparser, the punctulæ more walnut brown; in the female the whole pronotum is rather evenly atomaceous punctulate with walnut brown, with faint indications of a lyrate pattern made up of larger dots, which are somewhat darker, a relatively regular intermarginal girdle of spaced larger walnut brown punctæ is also indicated. Tegmina of male with discoidal and anal fields resembling in coloration the disk of pronotum, marginal field much as lateral sections of pronotum; tegmina of female with regularly stippled atomaceous pattern of walnut brown punctæ, some of those in the region of the humeral trunk larger and blackish fuscous, in the anal field the punctæ show a disposition to follow veins. Dorsum of abdomen densely punctulate with blackish fuscous to prout's brown, in the male so densely that the color is almost solidly blackish brown; in the females less heavily, with a weak pale median bar indicated by weaker character of overlying dark pattern, in the female the welt-like ridges are russet to cinnamon-brown. Cerci ochraceous-buff very narrowly tipped with prout's brown. Limbs and coxæ cinnamon-buff to orange-cinnamon, punctulate with prout's brown to blackish fuscous; coxæ blotched proximo-cephalad with same and cephalic femora occasionally (male) lineate dorsad and cephalad with blackish fuscous. Venter of male abdomen virtually solid blackish fuscous; of female proximad patterned much as dorsum of abdomen, distad becoming more densely punctulate until subgenital plate is solidly blackish fuscous; styles of male of general color.

The male (type) is of a very intensive type of coloration, so that evident colorational features found in the females are there often obscured or but faintly apparent.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, type.................	13.6	4	6.1	4.3	3.7mm.
♀, allotype............	18	5	7	4.3	4.8
♀, paratype...........	18.6	4.8	7	4.5	4.5

In addition to the type and allotype we have before us a paratypic female taken between 4400 and 4700 feet in the same area as the type, on July 22, 1924. The type and allotype were shaken from bromeliads growing low down on several trees in rather open forest at 4650 feet elevation, near the junction of the Clydesdale-Cinchona and Pleasant

Hill trails. The paratypic female was taken from under dead wood in denser forest. The sole apparent noteworthy difference between the allotype and the paratypic female is that the papilliform sculpture of the abdominal tergites is more evident in the paratype and more like the condition found in the male sex.

In certain respects the present species stands between the genotypic species, *carinulata* of Central America, and the Cuban *hamiltoni*, combining certain characters of each. The tegminal features are virtually intermediate between those found in these two species, not only in the shape but also in the development and emphasis of the venation. That this corresponds to their respective geographic positions may be much more than mere coincidence.

Epilampra Burmeister

The genus *Epilampra* is one of those assemblages which have developed within the tropics of both hemispheres a vast number of species, often quite distinct, again closely related and difficult to distinguish. With a general type of coloration the fluctuations of which make definite and exact characterization difficult, if not at times virtually impossible, it combines a uniformity of development in numerous other features, that in general in the family are sufficiently varied to prove of value to the systematic student. To add to the uncertainty of a situation difficult at best, we find many of the published descriptions almost valueless to aid in the recognition of these forms. As a whole the genus is one of the most difficult, obscure and generally unsatisfactory to study in the entire Blattidæ.

We have given very considerable time to the study of the West Indian members of the genus, and, everything considered, feel the results have been satisfactory. All of the peculiarly West Indian species have been recognized by us but one. Two South American species have been recorded from the West Indies which we have not seen from that region, and in at least one of the cases the identification has been found to be erroneous. The two species are *E. conspersa* Burmeister and *E. cribrosa* of the same author. The first was recorded by Scott, on Shelford's determination, from Dominica,[1] while *cribrosa* was reported by Caudell from the same island.[2] As we are showing below under *abdomen-nigrum* the record of *cribrosa* relates to the former species, the material upon which the record was based having been recently examined by the present authors.

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[1] 1912, Ann. and Mag. Nat. Hist., (8) X, p. 430 [Mountains behind Roseau, Dominica; elevation over 1000 feet, in *Tillandsia* in virgin forest].

[2] 1914, Proc. U. S. Nat. Mus., XLVII, p. 491.

The West Indian forms tentatively can be assigned to the following species groups.

Cubensis Group, comprising *cubensis* Bolivar only.
Mexicana Group, containing *insularis* and *tainana*, new species.
Abdomen-nigrum Group, containing *mona*, new species, and *abdomen-nigrum* (DeGeer).
Burmeisteri Group, composed of *gundlachi*, new species, *burmeisteri* (Guérin), *wheeleri* Rehn, *haitensis*, new species, and *sabulosa* Walker.
Grisea Group, containing *quisqueiana*, new species.

The *Mexicana* and *Grisea* Groups are known to contain forms other than those here treated, and probably this will be found to be true of the other assemblages when our knowledge of the South American forms is more complete and connected. As found in the West Indies the *Cubensis* and *Mexicana* Groups occur only in Cuba, although the latter is widely distributed continentally. The *Abdomen-nigrum* Group ranges from Jamaica, Mona Island and Porto Rico through the Lesser Antilles to northern South America and Amazonia, but is unknown from Cuba and Hispaniola, although occurring northward on the Central American mainland as far as southern Mexico. The *Burmeisteri* Group is apparently restricted to the Greater Antilles, while the *Grisea* Group occurs in Hispaniola. The *Grisea* Group is, however, one of wide distribution in northern South America.

KEY TO THE WEST INDIAN SPECIES OF *Epilampra*[1]

1. Tegmina not surpassing apex of abdomen..............................2.
   Tegmina surpassing apex of abdomen..............................4.
2. Tegmina of female abbreviate, reaching only to middle of abdomen; anal sulcus of tegmina with a black line. (Head black.) [Cuba.]....*cubensis* Bolivar.
   Tegmina of female more elongate, their apices reaching to between middle and apex of abdomen[2]; anal sulcus of tegmina without a black line........3.
3. Size smaller (length of body, ♀, 18.5–20 mm.). Face below antennæ with two transverse markings of fuscous. Pattern of pronotum and tegmina strongly contrasted. Abdomen with pronounced pale lateral margins on both dorsal and ventral surfaces. Female supra-anal plate very shallowly emarginate mesad. [Mona Island.]..........................*mona*, new species.
   Size larger (length of body, ♂, 17.5–23.2 mm., ♀, 22–29). Face below antennæ with dark punctulæ but no decided transverse bars. Pattern of pronotum and tegmina never strongly contrasted. Abdomen without contrasted

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[1] This table is entirely artificial in construction and is based solely on the species which are unquestionably West Indian in occurrence.

[2] *Abdomen-nigrum* by variation in Mexico and South America reaches a point where it might be confused with *cubensis* on account of tegminal length, but the color features given for *cubensis* are not possessed by the first-mentioned species.

pale lateral margins. Female supra-anal plate quite deeply and sharply divided mesad. [Jamaica, Porto Rico, Lesser Antilles and much of continental tropical America.] . . . . *abdomen-nigrum* (DeGeer).

4. Humeral trunk of tegmina with a solid lining of blackish or dark brown for at least proximal fourth of tegmen . . . . 5.

Humeral trunk of tegmina without a solid lining of blackish or dark brown, infuscation of this region always in the form of patches or punctæ . . . . 9.

5. Marginal field of tegmina hardly contrasted in base color with remainder of tegmina; dark punctæ of tegmina distinct, isolated and not merging into an atomaceous punctulation. (Size medium. Disk of pronotum with no distinct lyrate pattern. Subgenital plate of male with a distinct circular dark discal spot.) [Cuba and Jamaica.] . . . . *gundlachi*, new species.

Marginal field of tegmina sharply or appreciably contrasted in base color with remainder of tegmina; dark punctæ of tegmina relatively hidden in a general mantling atomaceous punctulation, producing a decided "pepper and salt" appearance . . . . 6.

6. Form more slender, size smaller (length of body, ♂, 18 mm., ♀, 18–19.5). Lyrate pattern of pronotum always weak or hardly indicated. Pale base color of marginal field of tegmina of great extent, covering scapular field as well. Dark lining of humeral trunk of tegmina continued solidly or by decided indications to distad of middle of tegmen. (Abdomen without dark marginal blotches; male subgenital plate without dark discal spot.) [Cuba.] . . . . *burmeisteri* (Guérin).

Form more robust, size larger (length of body, ♂, 19–21.5 mm., ♀, 20–23.8). Lyrate pattern of pronotum distinct, though not always strikingly indicated. Pale base color of marginal field of tegmina limited to that field, or gradually blending into basal tone of scapular field. Dark lining of humeral trunk of tegmina not indicated at all distad of middle of tegmen . . . . 7.

7. Lateral margin of pronotum and costal margin of tegmina not lined with blackish fuscous. Lateral section of pronotum and marginal field of tegmina having pale base color little contrasted with base tone of pronotum and discoidal field of tegmina . . . . 8.

Lateral margin of pronotum and costal margin of tegmina lined with blackish fuscous. Lateral section of pronotum and marginal field of tegmina distinctly, though not sharply, contrasted with base tone of pronotal disk and discoidal field of tegmina. (Normally covered portion of right tegmen deep chestnut-brown. Abdomen having dorsum with decided dark lateral margins.) [Hispaniola.] . . . . *haitensis*, new species.

8. Form more robust, pronotum heavier and broader proportionately. Interocular space in female appreciably greater than occipital depth of eye; in male slightly greater than same. Tegmina with costal margin more regularly arcuate; punctulations of tegmina more reddish; lining of humeral trunk covering but one-third of tegminal length. [Porto Rico.] *wheeleri* Rehn.

Form more slender, pronotum proportionately smaller. Interocular space in female subequal to occipital depth of eye; in male equal to two-thirds of same. Tegmina with costal margin less arcuate and more sigmoid; punctulations of tegmina more fuscous; lining of humeral trunk covering approximately one-half of tegminal length. [Hispaniola.]....... *sabulosa* Walker.

9. Size larger (length of body, ♀, 24–26 mm.). Interocular region and much of face solidly blackish fuscous. Dorsum of abdomen strikingly marked with fuscous.. 10.

Size smaller (length of body, ♀, 20–22.5 mm.). Interocular region only in part and not solidly blackish fuscous. Dorsum of abdomen with no marked fuscous pattern. [Hispaniola.].................. *quisqueiana*, new species.

10. Dark pattern dense and greatly mantling the pale base color, particularly in discoidal and anal fields of tegmina. Face with lower portion largely pale. Disk of pronotum with lyrate pattern and punctulations combining to nearly obscure pale base color. Ulnar rami of wings more longitudinally directed. Venter of abdomen heavily punctulate with blackish fuscous. [Cuba.].. *tainana*, new species.

Dark pattern sparse, far less evident and not mantling pale color. Face with lower portion solidly dark with interocular region. Ulnar rami of wings more transverse in direction. Venter of abdomen largely solid blackish fuscous with very narrow pale lateral margins. [Cuba.]. . *insularis* Bolivar.

Epilampra cubensis Bolivar

E[pilampra] cubensis Bolivar, 1888, Mém. Soc. Zool. France, I, p. 127. ♀; Cuba.

Epilampra cubensis Gundlach, 1890, 'Contrib. Entom. Cubana,' IV, p. 308. Mata, east of Baracoa, Oriente, Cuba.

This species we have not seen, and there exists a strong possibility it is a member of the genus *Audreia*, although its reference to the genus *Epilampra*, as now understood, may be as well justified today as when Bolivar described the insect.

The distinctive feature of the species seems to be the possession of abbreviate tegmina, which reach only to the middle of the abdomen, have the marginal field very broad, and in shape are attenuate toward the apex. The coloration is castaneous, with the head black, while the tegmina have a black line close to the anal vein. The length of the body is 20 millimeters, of pronotum, 6.5, of tegmen, 10.

No other West Indian species of the genus *Epilampra* known can well be confused with *cubensis*, and the tegminal form alone will at once distinguish it from *Audreia hamiltoni* and *jamaicana*, the known West Indian members of that genus.

Epilampra insularis Bolivar

Plate XVI, Figures 6 to 8

[*Epilampra mexicana*] var. *insularis* Bolivar, 1888, Mém. Soc. Zool. France, I, p. 128. ♀; Cuba.

Epilampra mexicana [var. *insularis*] Gundlach, 1890, 'Contrib. Entom. Cubana,' IV, p. 309. Bayamo and Yateras, Oriente, Cuba.

CUBA.—El Alto de la Union, Monte Libano, near Guantanamo, Oriente Province, V, 18, 1913, (C. T. Ramsden; in woods), 1 ♀, [A. N. S. P.].

This species is extremely close to the succeeding one, which might be confused with it. The differential features of the species are discussed under *tainana*. Bolivar mentions a variety of *insularis*, which he characterizes, as, "Variat supra cum elytris ferruginea, punctis sanguinis subobsoletis variegata." The present specimen is of this phase, and no representative of the somewhat darker, less strongly rufescent form of the species has been seen by us.

Bolivar originally referred this insect to *E. mexicana* with the varietal designation of *insularis*, but frankly admitted that *mexicana* was unknown to him except from the literature. We now have before us material of *mexicana* from Mexico and Central America, and we find that, though closely related, *insularis* and *mexicana* are quite distinct and may be distinguished by the smaller size of *insularis*, its more solidly infuscate face, greater interocular space in the female sex, shallower median incision of the female supra-anal plate, which also has the lateral arcuations more pronounced, the solid infuscation of most of the distal and lateral sections of the venter of the abdomen, and the more slender and attenuate tarsi, particularly the caudal pair, which also have the distal half or more of each article solidly infuscate, instead of but a narrow distal section as in *mexicana*.

In all probability *insularis* is restricted in its distribution to areas of primæval forest in eastern Cuba, where it occurs in company with *tainana*, described below.

Epilampra tainana,[1] new species

Plate XVI, Figures 9 to 11

An intensively patterned and very dark species, which is comparable solely among the West Indian species with *E. insularis*, occurring in the same region. Of the other tropical American species which we have before us it bears closest resemblance to *E. columbiana* and *mexicana* Saussure and *stigmosa* Giglio-Tos, while there is quite a suggestion of the Brazilian *agathina* Saussure.

From *E. insularis* the new species may be distinguished by the far heavier and denser dark punctulation, which is so heavy in the anal and discoidal fields of the tegmina as to almost obscure the paler base color, the piceous of the face less solid and broken into more or less distinct transverse bars ventrad of the eyes, the more longitudinally directed ulnar rami of the wings, the more elongate femora, particularly the cephalic pair, and by the venter of the abdomen not being solidly piceous anywhere, but punctulate and marmorate with the same. From *columbiana*, *tainana* can at once be distinguished by the more longitudinal and less transverse pronotum, the broader interspace between the eyes (female), the more regularly distributed punctulate pattern of the tegmina, which in *columbiana* does not strongly intensify and mass in the anal and discoidal fields of the tegmina but remains more sharply defined, in the more numerous ulnar rami of the wings, and the presence of a piceous punctulate pattern on the abdominal venter. From *stigmosa* the present species is separable by the same features as from *columbiana*, except that the pronotal form shows less difference and the ventral coloration is not as strikingly different as in *columbiana*, but in addition *tainana* is larger, with the subgenital plate less broadly rounded and more rostrate mesad, and the caudal tarsi are longer. From *mexicana*, *tainana* at once can be distinguished by its darker coloration, slightly smaller size, facial coloration and other features.

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[1] After the native Tainan Arawak Indian stock of the Greater Antilles.

Type.—Female; "El Peru," Monte Libano, near Guantanamo, Oriente Provvince, Cuba. April 13, 1913. (Charles T. Ramsden.) [Academy of Natural Sciences of Philadelphia, Type No. 5380.]

Size large; form robust.

Head with interspace between eyes broad, slightly greater than that between ocelli.

Pronotum moderately transverse, greatest length contained one and three-tenths times in greatest width; lateral sections rather decidedly declivent; surface of disk with one pair of median and one of postmedian depressions: cephalic margin relatively short, arcuato-truncate, passing into the arcuato-truncate and thickened lateral margins; caudo-lateral angles rounded sub-rectangulate; caudal margin moderately produced and narrowly rounded mesad.

Tegmina surpassing apex of abdomen by about pronotal length, very ample: costal margin moderately arcuate to middle of tegmen; apex well rounded rectangulate, slightly more costal than sutural in position: marginal field relatively broad; anal field elongate pyriform, apex reaching to two-fifths of total length of tegmen; rami of veins and nervures in all fields numerous and closely placed. Wings with ulnar vein bearing twenty-four rami, these diverging at an angle slightly more acute than 45°, becoming even more longitudinal in distal third.

Abdominal tergites with disto-lateral angles produced into distinct aculeate spines. Supra-anal plate produced, proximal width but little greater than length, semi-elliptical in outline, lateral margins arcuate convergent, meso-distad distinctly acute-emarginate, each lateral margin regularly arcuate over the paired lobations to the median emargination. Cerci slightly surpassing apex of supra-anal plate, tapering. Subgenital plate large, broad, greatest proximal width nearly twice as great as median length of same; median section of plate subrostrate and feebly compressed; intercercal section of margin rounded rectangulate.

Limbs moderately robust. Cephalic femora moderately slender, greatest width contained about four times in greatest length of same; ventro-cephalic margin with four large proximal and two large distal spines, intervening series subpiliform; ventro-caudal margin with four large spaced spines, one of which is distal. Median and caudal femora with ventral margins with large spines. Caudal tarsi somewhat less than three-fourths as long as caudal tibiæ, slender; caudal metatarsi biseriately spinulose ventrad, pulvilli distinct, arolia pronounced; tarsal claws equal, margins simple.

Base color cream-buff to cinnamon-buff, heavily mantled under a dense pattern of chestnut-brown to fuscous, which is at times so solid as to almost or quite obscure the pale base color. The pattern as described in the following lines refers to the mantling color. Head with occiput largely dark, occasionally (type) showing pale mesad; interocular region solidly dark, interocellar region pale mesad, infra-ocellar sections dark, ventral section of face largely dark transversely, dorsal section of clypeus transversely dark, paler areas of face punctulate with dark; eyes blackish fuscous; antennæ almost or entirely dark. Pronotum with dark lyrate pattern indicated but merging into a general dark and dense atomaceous punctulate pattern, which leaves a pre-median series of six transversely disposed pale spots, a median pale pair and a post-median series of three; laterad the punctulate pattern is less dense; lateral margins lined with dark. Tegmina completely covered with a dark punctulate pattern similar to that of the pronotum, less dense in the marginal and scapular fields, more dense in the anal and discoidal fields, becoming almost solid in the normally covered sections of these areas of the dextral tegmen, the punctulate character of the pattern becoming more blotchy and marmorate distad; punctulations of scapular field disposed along the rami and particularly marked at their junction with the costal margin; humeral trunk without solid lining but covered with marmorate punctulations. Abdomen with dorsum bearing a transverse dark pattern, caused by proximal and distal dark barring of each segment, these bars becoming subconfluent on distal segments, pale areas dark punctulate; supra-anal plate dark proximad, becoming pale distad, with that section distinctly dark punctulate, two pale areas present in dark proximal section; cerci pale with segments transversely dark barred; venter of abdomen thickly dark punctulate, the punctulations more closely placed laterad than elsewhere, except for usual lateral series of pale areas; subgenital plate with much of its surface solidly dark, this variable individually but most apparent on each side of rostrate section of subgenital plate. Coxæ, femora and tibiæ to a variable degree, but always a very evident one, punctulate with dark; femora lined on margins and distad, and tibiæ washed on margins and distad with dark, sculpture lines on cephalic and caudal faces finely lined with dark; tibial spines ferruginous, dark tipped; tarsi with joints dark distad, by variation these almost entirely dark.

In addition to the type we have before us a paratypic female bearing the same data as the type, and another paratypic female labelled, "La Victoria," Monte Toro, near Guantanamo, Oriente Province, Cuba, April 30, 1912, (C. T. Ramsden), both in the collection of the Academy of Natural Sciences of Philadelphia. We have also seen two immature females in the instar preceding maturity, which were taken at

Measurements

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♀, "El Peru," Monte Libano, Cuba, type..	24.5	7.3	9.5	27.5	8.3 mm.
♀, "El Peru," Monte Libano, Cuba, paratype................	24.6	6.9	8.9	26.4	8
♀, "La Victoria," Monte Toro, Cuba, paratype............	26	7.7	9.5	28.3	8.8

the same time and same locality as the type; and seven immature individuals, representing both sexes and the two instars preceding maturity, which were taken from under dead leaves, on stream bank on the cafetal "Virginia," Yateras, near Guantanamo, Oriente Province, Cuba, on March 10, 1924, by C. T. Ramsden, and three more immature individuals representing two instars, from Guantanamo, taken June 15, 1924 by the same collector.

Epilampra mona, new species

Plates XVI, Figures 12 and 13; XVII, Figure 1

A very distinctive species, with a fascies quite different from that of any West Indian or other form of the genus known to us. It is, apparently, nearer to *E. abdomen-nigrum* than any other species before us, but it can at once be distinguished by its smaller size, heavily punctate and contrasted pattern, the light tint of the ground color, the depth and extent of the pronotal pattern, the strikingly different and distinctive facial pattern, the very shallow median emargination of the female supra-anal plate, the more slender and less obese abdomen, and the presence of broad and sharply contrasted pale lateral margins of both the dorsal and ventral surfaces of the abdomen. Doubtless when the male sex is known differences in the genital features of that sex will be found.

Type.—Female: Playa Sardinera, Mona Island, West Indies. February 24, 1914. (F. E. Lutz; in *Tillandsia uttreulata.*) [New York Academy of Sciences; American Museum of Natural History.]

Size relatively small; form robust.

Head as broad as deep when seen from cephalic aspect, in dorsal view visible cephalad of pronotum for almost entire width of head; interocular space very broad, appreciably greater than interocellar space, equal to one and two-thirds times greatest depth of eye.

Pronotum with greatest length equal to one and one-half times greatest width of same; lateral portions considerably deflexed, but broadly rounding into disk; surface without marked depressions, a group of spaced puncta which have little relation to the color pattern placed mesad and caudad of middle: cephalic margin narrowly subtruncate, broadly rounding into the subarcuate lateral margins; caudo-lateral angles rounded obtuse-angulate; caudal margin moderately produced mesad.

Tegmina reaching apex of supra-anal plate, relatively broad: costal margin regularly arcuate, apex strongly and sharply rounded: marginal field broad; anal field pyriform, anal sulcus joining sutural margin very slightly short of middle of tegmen. Wings reaching to apices of tegmina.

Abdomen relatively broad, tergites with caudo-lateral angles very briefly angulate-produced, hardly at all spiniform. Supra-anal plate transverse, greatest proximal width equal to twice greatest length of same, lateral margins regularly arcuate convergent to the very shallow and wide obtusely-angulate median emargination. Cerci slightly surpassing supra-anal plate in length, subfusiform, acute distad. Subgenital plate large, greatest length contained more than twice in proximal width of same, infra-cercal emargination very shallow and broad, disto-median section of margin regularly arcuate.

Limbs robust for this genus. Cephalic femora with ventro-cephalic margin having four spaced proximal and two distal large spines, margin between with series of minute spinulations, ventro-caudal margin of cephalic femora with four large spaced spines, one distal in position. Ventral margins of median and caudal femora regularly armed with large spines. Caudal tarsi about three-fourths as long as caudal tibiæ; caudal metatarsi comprising nearly one-half of entire tarsal length, ventrad biseriately spinulose, pulvilli well developed; arolia well developed; tarsal claws equal, margins entire.

Base color light ochraceous-buff, with a faint clay color tendency on pronotal disk, anal and discoidal fields of tegmina and dorsum of abdomen; disk pattern strongly contrasted, blackish fuscous to bay, the latter only on tegmina, and as follows in distribution. Occiput largely clouded with dark, with three narrow longitudinal pale lines; interocular region with four, rather small, transversely disposed solid dark blotches, well separated from occiput; interocellar region with a pair of large, roughly diamond-shaped dark blotches connected mesad and weakly in contact with interocular series, ventrad of ocelli and interocellar region is a transverse bar of dark, narrower mesad than laterad, face immediately dorsad of facio-clypeal suture with a transverse dark marking which mesad is triangularly divided by the pale base color; face with pale base color sparsely dark punctulate: eyes fuscous; antennæ heavily washed with dark. Pronotum with a dark atomaceous punctulation, which is more pronounced and denser on the disk, and a dark pattern made up of a heavily indicated lyrate pattern, a premedian group of transversely disposed dark blotches, a similar and heavily indicated infuscation of the caudal margin on the disk, and a general and regularly distributed dark punctulation; lateral margins of pronotum somewhat darkened. Tegmina with humeral trunk heavily infuscate, anal and discoidal fields with a heavily indicated and dense dark pattern of punctations, which pass into confluent blotches of bay distad, the normally covered portion of dextral tegmen solidly of this color; marginal field with a punctate pattern of clarity and disposition like that of the lateral sections of pronotum; costal margin of tegmina ochraceous. Wings pale dresden brown. Dorsum of abdomen clay color proximad, passing to the dark color distad; venter almost solidly shining blackish fuscous; laterad the tergites and sternites have areas of pale base color sharply contrasted with adjacent dark sections, and punctulate with dark; supra-anal and subgenital plates with distal margins of pale base color dark punctulate; cerci pale, narrowly dark tipped. Coxæ marked proximad and distad with dark, surface with scattered dark punctulations laterad; lining on extensor margin of femora, distad on same, linings and punctulations on cephalic faces of same, blotching at spine insertions on tibiæ and narrowly distad on tibiæ, also narrowly distad on tarsal joints, dark.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen
♀, Playa Sardinera, Mona Island, type	18.5	5.2	6.4	14 mm.
♀, Playa Sardinera, Mona Island, paratype	19.7	6	6.9	13
♀, Playa Sardinera, Mona Island, paratype	20	6	7.6	15.5

In addition to the type we have before us two paratypic females, bearing the same data as the type, except that one was secured on February 24, 1914, at light at night. These specimens show no noteworthy difference from the type, except that in one the number of major proximal spines on the ventro-cephalic margin of the cephalic femora is three, instead of the more usual four. One specimen, the first paratype measured, has the pattern more intensive than in the type, the other paratype has it more recessive, and the lyrate and caudal dark markings of the pronotal disk in consequence are more open and less opaque.

Epilampra abdomen-nigrum (DeGeer)

Plate XVII, Figures 2 and 3

Blatta abdomen-nigrum DeGeer, 1773, 'Mém. Hist. Ins.,' III, p. 538, Pl. xliv, fig. 5. ♀; Surinam.

Blatta livida DeGeer, 1773, idem, p. 538, Pl. xxxiii, fig. 6. ♂; Surinam.

E[*pilampra*] *brevis* Brunner, 1892, Proc. Zoöl. Soc. London, p. 203, Pl. xv, fig. 3. ♂, ♀; St. Vincent, West Indies; Gayenne.

Epilampra maya Rehn, 1902, Trans. Amer. Entom. Soc., XXIX, p. 3. ♀ (recorded in error as a ♂); Machuca, Nicaragua.

Epilampra abortivipenna Rehn, 1903, idem, p. 273. ♂ (recorded in error as a ♀); Bartica, British Guiana.

Epilampra maya brachyptera Hebard, 1921, idem, XLVII, p. 210, Pl. xiii, figs. 9 and 10. ♂, ♀; Minatitlan, Vera Cruz, Mexico.

JAMAICA.—1922, 1 ♀, [U. S. N. M.].

PORTO RICO.—San Juan, 1 ♀, [U. S. N. M.]. Rio Piedras, Department of Humacao, VI, 5, 1922, (F. Sein), 2 ♀, [Dept. of Agr. Porto Rico]. Bayamon, Department of San Juan, I, 1899, (A. Busck), 1 ♀, [U. S. N. M.].

DOMINICA.—Long Ditton, VI, 20 to 22, 1911, (F. E. Lutz), 1 ♂, 1 ♀. No exact locality, VI to VII, 1913, (H. W. Foote; Yale-Dominican Exped.), 1 ♀, [U. S. N. M.].[1]

ST. LUCIA.—Castries, IX, 10–22, 1919, (J. C. Bradley), 2 ♀, [Cornell Univ.].

GRENADA.—(Mrs. W. E. Broadway), 1 ♂, 3 ♀, [Hebard Cln.].

The occurrence of this species in Jamaica and Porto Rico is noteworthy but, to our minds, may be due to its introduction, probably from Trinidad, the Guianas or Amazonian Brazil. This probability is suggested by the character of the material, as explained below. The species may be endemic in Grenada, and also in St. Vincent, St. Lucia, Dominica and Guadeloupe, from three of which islands it previously has been recorded.[2] We feel, however, that it is more probably not a native of the West Indies, and particularly of the Greater Antilles. Against this attitude stands the fact of the rather peculiar appearance and greater size of the Dominican specimens and large size of the Jamaican specimen seen.

The re-examination of the types of DeGeer's *abdomen-nigrum* and *livida* by Shelford[3] demonstrated the relationship of the two, *abdomen-nigrum* being based on the female and *livida* on the male sex, also their proper generic position and the specific identity of *abdomen-nigrum* and *brevis* of Brunner. The two DeGeerian names were overlooked by most authors up to and including the time of Kirby's 'Synonymic Catalogue,' and this was the major reason the names *brevis*, *maya*, and *abortivipenna* were proposed. Brunner in his 'Système' placed *abdomen-nigrum* with a query as a synonym of *Nyctibora holoericea*, which had the effect of diverting workers from considering it in connection with *Epilampra*. *Brevis* of Brunner was synonymized under *abdomen-nigrum* by Shelford and his action is supported by the material before us and the literature. The species *maya* was described from an individual dried from alcohol and considered a male, but it is now before us and is a female. On account of the more elongate alar organs it has quite a different general facies from the *brevis* of Brunner, and for this reason, and the more limited knowledge of blattid variation possessed at that time, the two were not compared. *Abortivipenna* (a lapsus calami for *abortivipennis*), in a similar fashion, was based on a specimen supposed to be a female, but which is now before us and proves to be a male. Here again an error in recognition of sex brought up supposedly bisexual differential characters, which are, instead, features of sexual difference. In addition the size of the male type of *abortivipenna* is well under that of Central American males typical of *maya*. The synonym of *abortivipenna* under *abdomen-nigrum* was established by Rehn several years ago.[1] Hebard's subspecies *brachyptera* was based upon a form of the species from the state of Vera Cruz, Mexico, which has distinctly abbreviate tegmina and wings, but in the light of the material now assembled the recognition of this form does not appear advisable, at least until our knowledge of the value to be assigned to such differences is more clearly understood.

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[1] Recorded by Caudell (1914, Proc. U. S. Nat. Mus., XLVII, p. 491) as *E. cribrosa*.

[2] From St. Vincent and Grenada by Brunner as *brevis*: from Guadeloupe by Shelford in discussing the type of *abdomen-nigrum*: from Dominica by Caudell as *cribrosa*.

[3] 1908, Trans. Entom. Soc. London, (1907), p. 460–461.

We now have before us the single female upon which Caudell recorded *Epilampra cribrosa* Burmeister from Dominica.[2] As shown above in our tabulation of material, we consider this to be a representative of the present species. The specimen has been completely dismembered, but it is quite large, in fact slightly larger than the female from Dominica measured below, and of the saturate type of coloration seen in the other Dominica individuals. We have examined the insect very critically, and are unable to find any valid reason for considering it other than the Dominican type of *abdomen-nigrum*.

At this writing we have before us material of the species from eleven localities, aside from the West Indian material here recorded, and it is evident that *abdomen-nigrum* is an exceedingly variable species, in general size, in relative alar development, and, to a lesser degree, in coloration. Material from Nicaragua, Costa Rica and Trinidad averages larger, in both sexes, than individuals from the state of Vera Cruz, Mexico (typical series of *E. maya brachyptera*), the Santa Marta region of Colombia, Demerara, Pará, Brazil, Grenada and Porto Rico. However, the material from Dominica is very large, in fact as large as any material seen and equalled only by Caparo, Trinidad individuals.[3] The tegmina appreciably surpass the apex of the abdomen in both sexes from Nicaragua, Costa Rica, Panama and Trinidad, while the Mexican, Colombian, Demerara and Pará, as well as the Grenada, St. Lucia,

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[1] 1916, Trans. Amer. Entom. Soc., XLII, p. 237.

[2] 1914, Proc. U. S. Nat. Mus., XLVII, p. 491.

[3] The single Jamaican female does not seem sufficient to warrant any assumption as to the general large size of Jamaican material.

Dominica, and Porto Rico, individuals have the tegmina and wings seldom surpassing, often not reaching, the abdominal apex. The single male from the Santa Marta region of Colombia[1] is remarkable in having the tegmina falling short of the abdominal apex by a distance equal to the pronotal length, the wings thus so reduced as clearly to be non-functional. While there would appear to be a geographic correlation of greater size and elongate alar organs, with portions of Central America and Trinidad, and of smaller size and reduced tegmina and wings with southern Mexico, the Guianas, the Pará region of Brazil and several of the West Indies, this cannot be advanced as conclusively demonstrated by the material in hand. The large size of the Dominica specimens of both sexes is not in accord with such an assumption, which is strongly suggested by the remainder of the series. More information may show a definite environmental correlation of these conditions, and this would have some support from the remarkable extremely short-winged condition of the Santa Marta, Colombia, male mentioned above, while the Panamanian representatives are all macropterous. Environmental conditions where the material from the two regions was collected are known to us to be very different. The Guianan and Pará individuals, and this is equally true of the Grenada, St. Lucia, Dominica and Porto Rico specimens in hand, all have, regardless of size, relatively uniform ratios of tegminal and abdominal length, which gives them a more oval outline than the more brachypterous Mexican representation. For this reason we feel convinced the Porto Rico, Dominica, St. Lucia and Grenada colonies are of Guianan or similar origin, although the age of their establishment, whether by human agencies or otherwise, remains to be determined.

The interspace between the eyes varies in width somewhat in each sex, the greatest space being found in the Dominican specimens, which in each sex show slightly more width than the Guianan representatives. There is, however, considerable individual variation in the larger representations from single localities, and the true geographic or individual value of this feature can be determined solely by the examination of larger series from single localities. We know that this feature is an individually fixed and constant one in certain species and a very plastic and fluctuating one in others.

The color variation is, as usual, of two types, one tonal, the other in strength of pattern. The West Indian material is in tone darker than most of the Central American representation, more in agreement with that from the Guianas and Pará. The Dominican pair is extremely dark in general tone, combined with a very intensive pattern. At this writing, however, it seems best to refrain from further comments upon this phase of the species' variation, pending more extensive evidence of the stability of tonal values at single localities. The pattern variation is one of intensification and recession, the former bringing a weak lyrate pronotal disk pattern out of the general pronotal stippling, an appreciable dark line on proximal third of humeral trunk, and a more pronounced castaneous infuscation of the normally covered portion of the right tegmen. The number of principal tegminal dots or spots varies, the proximal portion of the discoidal field being with or without several, while those distad in the same field are invariably present, even in the bachypterous individuals. The tegminal spots of the second size category vary greatly in their number and distribution. There does not appear to be any correlation of pattern variation with geographic regions, except that the Dominican pair have the heaviest pattern of any material examined.

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[1] Hacienda Bolivar, near Santa Marta, Colombia, VII, 15, 1920, (R. and H.), [Hebard Cln].

The West Indian material in hand, when compared with a Guianan pair, measures as follows.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Bartica, British Guiana (type of *abortipenna*)	20.8	5.5	6.7	15.5	5.7 mm.
♂, Grenada	17.5	5.6	7	16	6.1
♂, Long Ditton, Dominica	23.2	7.2	7.9	18.5	7
♀, Demerara	26.2	6.8	8.3	18	6.9
♀, Grenada	[1]	6.7	8.8	18.2	7.3
♀, Grenada	22	6.7	8.8	19.5	7.2
♀, Grenada	23.8	7	8.5	18.4	7
♀, Castries, St. Lucia	24	6.4	7.9	18.4	7.3
♀, Castries, St. Lucia	23.9	6.2	8	18.5	7.6
♀, Long Ditton, Dominica	29	8.2	9.3	22.4	8
♀, San Juan, Porto Rico	25.3	7.2	8.7	18	6.9
♀, Bayamon, Porto Rico	23.5	6.9	8.5	18.2	7
♀, Rio Piedras, Porto Rico	24	6.4	8.5	18.3	6.4
♀, Jamaica	28	7.2	8.3	24	7.2

[1] Lacking abdomen.

The range of the species have been covered in the discussion given above. We have seen no material from the area between the Santa Marta region of Colombia and Trinidad and the Guianas.

Epilampra gundlachi, new species

Plates XVII, Figures 4 and 5; XVIII, Figures 1 and 2

Epilampra burmeisteri SAUSSURE, 1864, 'Mém. Hist. Nat. Mexiq.,' III, p. 130, Pl. II, fig. 25. ♂, ♀; Cuba, by inference. (Only in part *Blatta burmeisteri* of Guérin, 1857.)

Epilampra burmeisteri SAUSSURE, 1870, 'Miss. Scientif. Mexiq.,' Rech. Zool., VI, p. 81. In part; Cuba only of localities given. (Not *Blatta burmeisteri* Guérin, 1857.)

E[pilampra] burmeisteri BOLIVAR, 1888, Mém. Soc. Zool. France, I, p. 128. In part; Cuba only, of localities given. (Not *Blatta burmeisteri* Guérin, 1857.)

Epilampra burmeisteri GUNDLACH, 1890, 'Contrib. Entom. Cubana,' IV, p. 309. Cuba. (Not *Blatta burmeisteri* Guérin, 1857.)

Epilampra burmeisteri SAUSSURE AND ZEHNTNER, 1893, 'Biol. Cent.-Amer., Orth.,' I, p. 66. ♂, ♀; Cuba. (Not *Blatta burmeisteri* Guérin, 1857.)

As will be seen from the above references this species has been long known, but the confusion surrounding it is equally old. This originated when Saussure in 1864 mistook it for *burmeisteri* of Guérin. As we are showing below under *burmeisteri* the present species is not that so named by Guérin, while Saussure's 1864 description and figure are unquestionably of the present species. This error of identification has persisted down to the present time; Saussure's first identification of it as a variety of *azteca* or Saussure and Zehntner's later name *caraibea* has been used by all authors for the true *burmeisteri*. A very critical examination of the literature involved has enabled us to state our conclusions with full certainty and conviction in the matter.

When compared with *E. burmeisteri* the present species is seen to differ in the male sex, the only one possessed of *gundlachi*, in its larger size, in the more transverse pronotum, which also has the cephalic margin more regularly arcuate, in the greatly reduced pattern of the pronotum, which has the regularly and closely punctulate pattern of *burmeisteri* replaced by a microscopic atomaceous sprinkling, in the tegmina being proportionately broader distad, in the base color of the marginal field of the tegmina, not being sharply contrasted with that of the remainder of the tegmina in the lining of the tegminal humeral trunk decided but short, in the tegminal pattern sparse but marked, not approaching the regular sprinkling of *burmeisteri*, in the irregularly disposed costal veins of the wings, in the more deeply incised male supra-anal plate, and in the presence of a large and striking blackish median spot on the male subgenital plate.

We take pleasure in dedicating this long unnamed species to Juan Gundlach, the great Cuban zoölogist.

TYPE.—Male; Baracoa, Oriente Province, Cuba. November, 1915. [Hebard Collection, Type No. 819.]

Size medium; form moderately elongate (for genus).

Head narrowly evident cephalad of pronotum when seen from dorsum, in cephalic aspect cordiform, as broad as deep; interocular space moderately broad for this sex, faintly broader than that between ocelli, slightly less than one and one-half times as broad as occipital depth of eye.

Pronotum about one and one-half times as broad as greatest length of same, greatest width slightly caudad of middle of pronotum; lateral portions moderately deflexed, broadly and regularly passing into disk: cephalic margin narrowly weak arcuate, regularly passing into the diverging and greatly arcuate lateral margins, caudo-lateral angles narrowly rounded obtuse-angulate; caudal margin moderately and rather broadly produced mesad.

Tegmina surpassing apex of abdomen by slightly less than one-half of pronotal length, broad, their greatest width contained very slightly less than three times in greatest length of same: apex rather narrowly rounded, more costal than sutural in position: marginal field of moderate width; anal field elongate pyriform, anal sulcus joining sutural margin but slightly proximad of middle; all wing nervures distinct and pronounced. Wings with costal veins quite irregular in disposition; ulnar rami twenty in number, regular in disposition and arcuation toward apex of wing.

Abdomen of medium build, caudo-lateral angles of tergites not produced, as usual in male sex of genus. Supra-anal plate transverse, greatest proximal width nearly twice greatest length of plate; margin strongly arcuate from lateral bases to median divided rectangulate emargination. Cerci somewhat longer than supra-anal plate, fusiform. Subgenital plate moderately transverse, distal margin arcuate, somewhat unsymmetrical, having dextrad a considerable but shallow concavity which is unrepresented sinistrad.

Limbs moderately robust. Cephalic femora with ventro-cephalic margin with three to four larger proximal and two large distal spines, the intervening section of margin with short spinulæ; ventro-caudal margin with four to five larger spaced spines, one of which is distal. Ventral margins of median and cephalic femora with well-developed spines.

General base color light ochraceous-buff, becoming pale ochraceous-buff on tegmina. Dark pattern as a whole between mars brown and prout's brown, as detailed below, except in parts specifically stated to be blackish fuscous. Head with occiput lightly marked proximad with dark, distad pale with sparse punctulations, interocular region with two large, subcontiguous areas of blackish fuscous, which are truncate dorsad and their internal margins arcuately diverging, abruptly limited ventrolaterad by the ocelli; a weak, transverse, mesad interrupted narrow line of dark, which in the middle of each lateral half has a sigmoid flexure; mesad on the lower face is a subcircular spot of dark; eyes chestnut-brown; antennæ ochraceous-tawny, moderately infuscate proximad. Pronotum with a minutely atomaceous punctulation, which is rather heavily and regularly distributed; a series of larger but still not at all conspicuous punctulations are scattered sparingly on the pronotum, more distinctly in a peripheral arrangement; meso-caudad is placed a few distant punctæ, which are arranged in pairs and probably represent the remnant of the lyrate pattern; lateral margins weakly lined with dark. Tegmina with humeral trunk strongly but irregularly marked with blackish fuscous for somewhat less than one-fourth of tegminal length; punctæ relatively few, well spaced, sharply defined, never confluent or nebulose, those of discoidal field relatively large, a few punctulations irregularly distributed in anal and discoidal fields; scapular field and apex with a regular marginal ticking of dark. Wings ample; costal veins irregular; ulnar vein with twenty rami, moderately arcuate. Abdomen with median portion of tergites moderately infumate and with scattered dark punctulations, also disto-lateral dark blotches, which leave a narrow pale lateral marginal edging; supra-anal plate with a transversely disposed, proximal shining blackish fuscous area; venter of abdomen with pattern of scattered dark punctations; subgenital plate with a large, subcircular spot of shining blackish fuscous which occupies almost the whole length of the plate. Coxæ in large part punctulate with dark, femora with numerous similar punctulæ; femora lined on extensor margin, on sculpture of cephalic face, a proximal and a pre-apical blotch, which are well marked only on cephalic pair, and at spine bases, with dark; tibiæ with spine bases marked with fuscous; tarsi with joints narrowly darkened distad; spines auburn.

Length of body, 23.3 mm.; length of pronotum, 4.7; greatest width of pronotum, 6.5; length of tegmen, 17.9; greatest width of tegmen, 6.5.

The type is the only specimen of this insect now before us.

Few exact localities have been given in the literature for the species. Gundlach says it is found over all the island of Cuba, while Rehn, in 1909, reported it from Cayamas, Oriente Province (as *burmeisteri*). Shelford[1] reports it, as *burmeisteri*, from Jamaica, Guiana and Brazil, although we feel certain the last two represent another species. The Jamaican record, however, is probably correct and may be that of an adventive from Cuba. At any rate this is the only species of the genus except *E. abdomen-nigrum* which has been recorded from Jamaica.

Epilampra burmeisteri (Guérin)

Plates XVII, Figures 6 and 7; XVIII, Figures 3 and 4

Blatta (*Phyllodromia*) *burmeisteri* Guérin, 1857, in La Sagra, 'Hist. Phys. Polit. et Nat. Île Cuba, Anim. Artic.,' p. 345. Cuba.

Epilampra burmeisteri Saussure, 1864, Mém. Hist. Nat. Mexiq., III, p. 130. Cuba, by inference. (Only in part *Blatta burmeisteri* of Guérin, 1857.)

Epilampra azteca var., Saussure, 1870, Miss. Scientif. Mexiq., Rech. Zool., VI, p. 83. Cuba. (Not *E. azteca* Saussure, 1868.)

E[*pilampra*] *azteca* Bolivar, 1888, Mém. Soc. Zool. France, I, p. 128. ♀; Cuba. (Not of Saussure, 1868.)

Epilampra azteca Gundlach, 1890, 'Contrib. Entom. Cubana,' IV, p. 310. Fermina, Cuba. (Not of Saussure, 1868.)

Epilampra caraibea Saussure and Zehntner, 1893, 'Biol. Cent.-Amer., Orth.,' I, p. 65. ♀; Cuba.

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[1] 1906, Trans. Entom. Soc. London, p. 276.

CUBA.—[No exact locality], (Gundlach), 1♂, 2♀, [Hebard Cln. and M. C. Z.]. Marianao, Havana Province, I, 23, 1914, (Hebard), 1 immature ♀, [Hebard Cln.]. Cotorro, Havana Province, VII, 1920, (José Cabrera), 2♂, 2♀, 1 immature ♀, [A. N. S. P.]. Baracoa, Oriente Province, II, 25, 1915, 1♂, [Davis Cln.].

As we have stated above under *E. gundlachi*, the present specific name has been erroneously used since 1864 for that insect. Such disposition of the name *burmeisteri* made the use of first *azteca* variety, and later the new name *caraibea* necessary for the present insect. It is unfortunate that the name *caraïbea* requires synonymizing and that the erection of a new specific one is necessitated, but the evidence in the case leaves no other alternative.

Guérin's description was based on "un seul individu mutilé auquel il manque l'extrémité de l'abdomen." The length was given as 21 millimeters, from which it would seem the type is or was a female. The pronotum is said to be "entièrement couvert de petits points bruns très-inégaux et moins rapprochés vers les bords ce qui rend ceux-ci un peu pâles." The tegmina are said to be "largement bordées de jaune pâle à leur marge externe," and also "elles sont couvertes de nervures saillantes de la couleur du fond et de petites taches brunes très-inégales, et offrent chacune une ligne noirâtre partant de l'angle huméral, séparant le jaune des bords de leur disque plus brun et s'effaçant insensiblement au delà de leur milieu." These features are convincing evidence of the identity of the present species as compared with *gundlachi*, the only other species which could be confused.

In 1870 Saussure, in the Mission Scientifique, states that "sous le nom de *burmeisteri* M. Guérin a confundu deux espèces, et nous avons continué cette erreur dans notre précédent travail." The latter remark refers to the 1864 citation in the Mémoires, which confounds the two species. Saussure is correct as far as his previous work is concerned, but, as shown above by the quotation from Guérin, wrong as far as the original author's type material is concerned. The original material having been unique the species could not have been based on two species, no matter what determinations were placed on material subsequently examined.

An examination of the 1870 descriptions, and those of *caraibea* and *burmeisteri* given in the Biologia (1893), will show that the species having the contrasted pale marginal field of the tegmina, sharply separated by the dark humeral trunk, and the heavily punctulate disk and anal fields of the same, is that called first *azteca* (by error), then *caraibea*.

As shown above this form answers Guérin's description, while Saussure's 1864 figure well represents the species we are calling *gundlachi*.

From the data now available this species is apparently restricted to the island of Cuba, over which it is widely distributed. Detailed records are available from Guanajay, Pinar del Rio Province (Rehn, in 1909, as *caraïbea*), Havana (the same recorder), Marianao, Havana Province, Fermina (Gundlach, in 1890, as *azteca*) and Baracoa, Oriente Province.

Epilampra wheeleri Rehn

Plate XVII, Figures 8 to 10

Epilampra wheeleri REHN, 1910, Bull. Amer. Mus. Nat. Hist., XXVII, p. 73. ♂; Mandios, near Utuado, Porto Rico.

PORTO RICO.—Adjuntas, Department of Aguadilla, VI, 8–13, 1915, (Lutz and Mutchler; in siftings from primæval high altitude forest), 1♂, [A. M. N. H.]. No exact locality, (E. A. Wagener), 1♀, [U. S. N. M.].

This interesting species is, as far as present knowledge goes, restricted to the higher country of Porto Rico, probably in the remnant areas of the original forest cover of the island. The two localities from which the species is known are in the western part of the central elevated section known as the "Cordillera Central." In the lower country about San Juan the genus is known to be represented by *E. abdomen-nigrum*, which may be an accidental introduction. *Wheeleri* is a well-defined member of the *Burmeisteri* Group of the genus and needs comparison solely with that species, *sabulosa* Walker and *haitensis* of the present authors. From *burmeisteri* the present insect differs in its appreciably greater size and more robust build, in the eyes being more widely separated in the male sex, in the pronotal punctulations being heavier and more dense, in the distinction in coloration between marginal and scapular fields and discoidal and anal fields of tegmina less sharply indicated, the dark lining of the humeral trunk less extensive in consequence, the marginal and scapular fields rather heavily punctulate with reddish, and the piceous spot on the disk of the subgenital plate indicated in both sexes. From *haitensis*, of Hispaniola, *wheeleri* can be separated by its distinctly larger size, by the less pronounced chestnut-brown color of the normally covered section of the right tegmen, by the more uniform character of its tegminal punctulations and their rufous color, the less distinct piceous disk of the male subgenital plate, by its more punctulate coxæ and femora and more densely cribroso-punctulate abdominal venter. From *sabulosa* Walker, also from Hispaniola, the Porto Rican insect is separated by its more robust build, proportionately broader pronotum, greater ocular interspace, paler occiput, more longitudinal lateral section of pronotum, when seen in profile, the caudo-lateral angles of same rounded sub-rectangulate instead of obtuse, in the shorter and broader tegmina, the costal margin of which is more regularly arcuate, and in the piceous character of the disk of the female subgenital plate, the same region in the male sex having its piceous infuscation covering all of the subgenital plate except narrowly along distal and lateral margins, instead of merely a disto-mesal blotch.

As the female sex was previously undescribed we are adding a few features of difference from the male, drawn from the female listed above.

Size medium; form relatively robust, elongate ovate in outline. Head with interocular space equal to one and one-third times greatest occipital depth of eye. Pronotum large, greatest length contained one and one-fourth times in greatest width of same. Tegmina surpassing apex of abdomen by about one-half of length of pronotal disk; costal margin well arcuate, particularly proximad; apex of anal field reaching to approximately middle of tegmen. Wings with costal veins regularly disposed; ulnar rami twenty-two in number, oblique, those proximo-distad more arcuate than those mesad. Abdomen with caudo-lateral angles of tergites rectangulate to very faintly produced. Supra-anal plate damaged; subgenital plate with its margin equally damaged.

The coloration of the female calls for but one comment. The subgenital plate has the medio-proximal portion and the center of the distal section dark, that proximad more maroon, that distad more fuscous, the latter with moderately sharp, pale lateral bounding lines.

The above listed female measures as follows: length of body, 22 mm.; length of pronotum, 6.8; greatest width of pronotum, 8.4; length of tegmen, 20.5.

Sein[1] has reported and figured what he considers this species from Porto Rico, stating it is encountered in abundance in fields of fodder. There appears to be little doubt in our minds but that *E. abdomen-nigrum* is the species he had before him, judging from the figure and his comments.

Epilampra haitensis, new species

Plate XXV, Figures 1 to 3

This interesting species, which has quite distinctive color features, is a member of the *Burmeisteri* Group. Its nearest relative is *E. wheeleri* Rehn, of Porto Rico, but it possesses readily recognized diagnostic color characters in the marked black edging of the lateral sections of the pronotum and of the proximal section of the costal margin, also in the lateral sections of the pronotum and the marginal field of the tegmina being distinctly, though not sharply, contrasted with the base tone of the pronotal disk and discoidal field of the tegmina. From *burmeisteri* it at once can be separated by the distinct lyrate pattern of the pronotal disk, the abbreviate dark lining of the humeral trunk of the tegmina and restriction of the pale ground color to the costal field, instead of its presence on both the costal and scapular fields of the tegmina, as well as the sparser character of the punctulations of the discoidal and anal fields of the same, by the dark disk of the male subgenital plate, and the coloration of the dorsum of the abdomen. The deep chestnut-brown of the normally covered portion of the right tegmen and the decided dark lateral margins of the dorsum of the abdomen are also features diagnostic among related West Indian forms of the genus.

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[1] 1923, Circ. No. 64, Dept. Agric. y Trabajo, Porto Rico, p. 11.

Type.—Male; Port-au-Prince, Haiti, Hispaniola. 1909. (G. Lion.) [Hebard Collection, Type No. 985.]

Size relatively small (for the genus); form ovate-elliptical; surface dully polished.

Head broad cordiform, greatest width across eyes subequal to greatest depth of head, occiput regularly arcuate when seen in facial aspect, eyes not at all prominent; occipital interspace between eyes broad, faintly greater than occipital depth of eye, least width between eyes but little dorsad of ocelli; interspace between ocelli slightly less than least width between eyes. Palpi relatively short, robust; antepenultimate joint short, but slightly longer than penultimate joint, deep; penultimate joint short, markedly infundibuliform; ultimate joint one and one-half times as long as penultimate joint, acute sublanceolate in lateral outline.

Pronotum with greatest length contained one and one-fifth times in greatest width of same, of the type and form usual in *Epilampra*, greatest width slightly caudad of middle; caudal margin markedly obtuse-angulate produced.

Tegmina relatively coriaceous, with apices surpassing apex of abdomen by approximately half the pronotal length, broad lanceolate, greatest width contained slightly less than three times in length of same; costal margin appreciably arcuate in proximal half, much straighter distad, rather briefly rounding to apex of tegmen; marginal field short and relatively broad, not reaching as far distad as apex of anal field; venation relatively heavy, numerous, differentiation between rami, axillary veins and intercalated veins little evident. Wings reaching to the tegminal apices when in repose.

Supra-anal plate with its general outline semicircular, narrowly divided mesodistad. Cerci moderately elongate, distinctly longer than median length of subgenital plate, tapering, subdepressed, distal joint elongate moniliform, blunt at apex. Subgenital plate not markedly asymmetrical, weakly oblique truncate dextrad from proximad of dextral stylar base to rounded apex, sinistral side of margin moderately arcuate, slightly oblique subtruncate distad of sinistral stylar base; styles simple, slender, subequal.

Cephalic femora having ventro-cephalic margin with three to four large, more proximal spines, a pair of unequal distal spines and an intermediate series of spinules; ventro-caudal margin of same femora with four large spaced spines. Caudal tarsi with proximal joint subequal in length to remaining joints combined.

Allotype.—Female; Pétionville, Haiti, Hispaniola. Elevation about 2250 feet. January 24 to 29, 1922. (F. E. Watson; under stones.) [American Museum of Natural History.]

The following features are those of difference from the description of the male sex.

Size somewhat larger.

Head with interspace between eyes broader, equal to one and two-thirds times occipital depth of eye.

Supra-anal plate essentially as in male. Subgenital plate large, transverse, broadly arcuate distad, infra-cercal emarginations shallow. Cerci distinctly shorter, about two-thirds as long as median length of subgenital plate, less attenuate distad, much more slender than in male; distal joint not elongate, hardly moniliform.

General pale base color light ochraceous-buff, becoming cinnamon-buff to clay color on disk of pronotum and anal and discoidal fields of tegmina, as seen from above the pale color is most evident and clearest on the lateral portions of the pronotum and marginal fields of the tegmina; venter very largely of the pale base color; dark overlying pattern largely blackish fuscous, passing to russet and prout's brown maculations distad on the tegmina. Head with four longitudinal occipital markings, the median pair more extensive cephalad and meeting the nearly (♀) or quite (♂) solidly dark interocular spot, which has a ventral tongue on each side reaching (♂) or internally embracing (♀) each ocellus. In the female the interocellar region is largely dark, producing a transversely fasciate appearance. Eyes prout's brown to fuscous. Antennæ washed with cinnamon-brown to prout's brown. Pronotum with dark overlay of disk relatively heavy, particularly in the female sex, made up of a dense marmorato-punctulate pattern, elements of which fuse to form a series of blotches and lines making an evident lyrate pattern; over the narrow, well-contrasted, paler lateral sections of the pronotum the punctulations become cinnamon-brown to russet; heavy lateral marginal pencilling of the pronotum, not indicated on cephalic or caudal margins, blackish fuscous. Tegmina with dark punctulations of scapular and discoidal fields rather evenly distributed, of the tones mentioned above, with scattered groups of larger dots, particularly in distal section of discoidal field; marginal field pale, but very sparsely punctulate with darker, costal margin of this field alone strongly lined with blackish fuscous similar to lateral margins of pronotum; a brief but distinct dark humeral line is indicated, while the normally covered portion of the right tegmen is strikingly and contrastingly chestnut-brown, or almost wine-colored. The dorsum of the abdomen has a transversely banded appearance, due to the presence of dark bars proximad on each segment, these broadened near the lateral margins, producing evident dark lateral borders; the supra-anal plate is largely dark with base and apical section of margin pale. The coxæ are almost unspotted, the femora lined with dark on extensor and cephalic surfaces, as well as distad. The tibiæ of the female are incompletely dark lineate, particularly dorsad, in the male the lineations are faint. Venter of abdomen punctulate with dark, more densely so laterad, the punctulations much fewer in the male than in the female, the size of the same varying appreciably, stigmatic spots decided. Subgenital plate of male with a median clouded blotch; of female with a pair of marked median dark dots, occasionally another more proximal pair. Cerci narrowly dark tipped.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Port-au-Prince, Haiti, type	18.5	5.1	6.2	16.8	6 mm.
♂, Pétionville, Haiti, allotype	19.2	5.1	6.6	18.5	6.2
♀, Pétionville, Haiti, paratype	20	5.2	7	20.4	....

We have before us in addition to the type and allotype a damaged female paratype bearing the same data as the allotype, and a female paratype, measured above, from the same locality, but taken by W. M. Mann and from the collection of the Museum of Comparative Zoölogy. The damaged female lacks its head, apices of the tegmina and is otherwise injured, so its measurements have not been given. The female collected by Mann has more elongate alar organs, but no other noteworthy features of difference are apparent.

Epilampra sabulosa Walker

Plate XXV, Figures 4 to 6

Epilampra sabulosa WALKER, 1868, 'Catal. Blatt. Brit. Mus.,' p. 70. ♀, "St. Domingo."

Epilampra microspila WALKER, 1868, idem, p. 208. ♂, "St. Domingo."

HISPANIOLA.—Port-au-Prince, Haiti, 1909, (G. Lion), 1 ♀, [Hebard Cln.]. Bourdon, Haiti, V, 19, 1922, (O. W. Barrett), 2♂, [Hebard Cln.]. La Moriniere, Haiti, elevation about 125 feet, III, 1–5, 1922, (F. E. Watson), 2♂.

Through the kindness of Mr. B. Uvarov, of the British Museum of Natural History, the types of Walker's *sabulosa* and *microspila* have been re-examined and compared with notes furnished by the authors. The notes and measurements supplied by Uvarov leave no doubt in our minds as to the identity of Walker's species, which were clearly based on opposite sexes of the same species. Detailed comparisons of our material have been made with the notes drawn from the types, and with the detailed measurements given by Uvarov, the result of which is that the apparent differences are found to be sexual. The measurements given below show the agreement in size of our material with the typical specimens, as measured by Uvarov.

The major features of difference of this species from *burmeisteri* are the greater size, the more uniform coloration, with contrast of the tegminal fields far less marked, the distinct lyrate pattern of the pronotal disk, the facial pattern and the less distinct eyes, while the subgenital plate of the male has its disto-mesal section solidly blotched with pitch brown. From *wheeleri* the differential features have already been cited under that species. From *haitensis*, the present species can be distinguished by a more elongate form and more slender build, different facial pattern, which is largely punctulate without a solid purely interocular bar, size difference, absence of dark lateral marginings of the pronotum, the more elongate and less opaque tegmina, the darkened pencilling of the humeral trunk of the tegmina, lack of marked coloring of the normally covered portion of the dextral tegmen, more extensive and solid dark blotch on disk of male subgenital plate, and heavily punctulate limbs.

The species is a member of the *Burmeisteri* Group, and in general appearance much suggests *wheeleri*, to which it is more nearly related than to any other known to us. Its chief characteristics are as follows.

Form of medium build. Head with interspace between eyes equal to two-thirds of (♂) or barely greater than (♀) greatest occipital depth of eye; facial pattern consisting of numerous good-sized dark punctulations, which sometimes (♂ weakly, ♀ distinctly) coalesce into an inter-antennal-ocular subquadrate patch, which is sufficiently broken dorsad to show its origin; occiput largely dark. Pronotum of same general shape as in *wheeleri* but smaller and less robust, lateral margins as remarked under *wheeleri;* pronotal dark pattern—a central lyrate figure, an encircling group of fair-sized punctæ, and over all an atomaceous punctulation, no dark lateral marginal linings. Tegmina surpassing apex of abdomen by about pronotal length, relatively elongate, moderately hyaline; pattern much like in *wheeleri*, but darker and without rufous tendency, the individual points sharper, smaller and dot-like, the lining of the humeral trunk more extensive and largely solid. Limbs heavily dark punctulate, the femora also lined on cephalic and extensor surfaces; tibiæ with dorsal and ventral surfaces appreciably lineate mesad with dark. Subgenital plate of male with medio-distal section solidly pitch brown, leaving pale buff margins entire; subgenital plate of female with no solid blotch, merely proximal concentration of atomaceous punctulæ.

Apparently this species has a distribution extending over both of the republics of Hispaniola, although Walker's "St. Domingo" may refer to the island as a whole and not to the Dominican Republic alone.

Measurements

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, "St. Domingo," Walker's type of *microspila ex* Uvarov	20.5	5	6	20	6 mm.
♂, Bourdon, Haiti.....	20	5.1	6	18	5
♂, Bourdon, Haiti.....	20.7	5.6	6.5	20	5.8
♂, La Moriniere, Haiti.	18	5	6.4	18.8	5.6
♂, La Moriniere, Haiti.	18.6	5.3	6.2	18.8	5.8
♀, "St. Domingo," Walker's type of *sabulosa, ex* Uvarov......	24	6	7.5	24.5	7
♀, Port-au-Prince, Haiti	23.8	6.5	8	23	7.4

Epilampra quisqueiana,[1] new species

Plates XVII, Figures 11; XVIII, Figure 6

This species belongs to a group, which we are tentatively referring to as the *Grisea* Group, comprising at least two other species known to us, i.e., *grisea* (DeGeer) and *substrigata* Walker. The first is a Guianan and eastern Brazilian form, the latter, as far as present knowledge is concerned, is a native of eastern Colombia. The three species agree in general facies; a relatively weak pattern with little contrast, lack of solid marking of humeral trunk and a peculiar darkening of the surroundings of the apices of the distal costal veins of the wings.

From *grisea* the present species differs chiefly in its somewhat smaller size, appreciably broader interocular space, different pattern of same and of face, more rounded occipital margin of eyes, the more numerous rami of the discoidal vein of the wings, the less truly triangular and more rounded in general outline male supra-anal plate, which also has the median emargination less pronounced, in the male subgenital plate being less trigonal and arcuate distad, and in the latter not having a pronounced dark discal spot. From *substrigateas*, *quisqueiana* differs in its smaller size and rather less robust build, narrow interocular space, which has, however, a similar pattern, in the more rounded occipital margins of the eyes, in the lack of chestnut-brown on the normally covered portion of dextral tegmen, more produced anterior field of the wings, in the median emargination of the male supra-anal plate being far shallower and less evident, and in the male subgenital plate showing the same differences as from *grisea*.

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[1] From "Quisqueya" an aboriginal name for Hispaniola.

Type.—Male; San Lorenzo,[1] Province of Samaná, Dominican Republic, Hispaniola. June 24–26, 1915. (F. E. Watson.) [American Museum of Natural History.]

Size relatively small; form as usual in the genus.

Head narrowly visible cephalad of pronotum for approximately entire head width; interocular space moderately wide, faintly less than occipital depth of eye, subequal to interocellar space; eyes large, dorso-internal margins against interocular space arcuate.

Pronotum of type usual in genus, lateral sections well deflexed, broadly rounding into disk; cephalic margin well arcuate and regularly passing by a rounded obtuse-angulation into the arcuato-truncate lateral margins; caudo-lateral angles more angulate than cephalo-lateral angles, yet rounded obtuse.

Tegmina surpassing apex of abdomen by approximately length of pronotum, in general of subequal width; costal and sutural margins in large part parallel, costal margin weakly arcuate proximad and briefly but sharply so to the relatively rounded apex, which is more costal than sutural in position: marginal field relatively broad; anal field elongate pyriform, anal sulcus reaching sutural margin at two-fifths of length of same. Wings with regularly placed costal veins; ulnar rami seventeen in number, moderately arcuate; anterior field of wing with its apex appreciably surpassing axillary region.

Abdomen with caudo-lateral angles of tergites obtuse-angulate, not produced. Supra-anal plate transversely rounded trigonal, lateral margins distinctly arcuate, median emargination very shallow and broad. Cerci moderately elongate, subdepressed, attenuate distad, their length about one and one-half times that of supra-anal plate. Subgenital plate but weakly asymmetrical; styles similar, slight, weakly decurved, dextral one less distal in its position than sinistral style.

Cephalic femora with ventro-cephalic margin bearing three large proximal and two large distal spines, spinulose between; ventro-caudal margin with four large spaced spines. Median and caudal femora with margins well armed. Caudal tarsi four-fifths as long as caudal tibiæ; caudal metatarsi comprising one-half of tarsal length; pulvilli distinct but not large; arolia evident; tarsal claws equal, margins simple.

Allotype.—Female; Sanchez, Dominican Republic, Hispaniola. May 11–16, 1915. (F. E. Watson.) [American Museum of Natural History.]

The following features are those of difference from the male sex.

Size medium. Interspace between eyes slightly greater than in male, subequal to occipital depth of eye; eyes slightly smaller.

Tegmina surpassing apex of abdomen by about one-half of pronotal length, proportionately broader than in male.

Abdomen with caudo-lateral angles of tergites as in male. Supra-anal plate with general form as in male, but median emargination deeper, fissate with the sides of the fissure in contact and seen from below apparently forming a tectate ridge. Subgenital plate very large, broad, margin shallowly and weakly concave ventrad of the cerci, well arcuate mesad. Cerci much shorter than in male, little surpassing supra-anal plate. Cephalic femora with ventro-cephalic margin having four spines proximad, remainder of margin armed as in male; ventro-caudal margin with five spines. Caudal tarsi about two-thirds as long as caudal tibiæ; caudal metatarsi comprising slightly more than one-half of entire tarsal length.

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[1] See p. 26, footnote 2

General pale color light ochraceous-buff to warm buff, with a closely stippled but not sharply contrasted pattern of darker, which varies from russet to mummy brown in tone. The pattern is distributed as detailed below. Occiput and dorsal interocular section dark punctulate, arranged roughly in longitudinal series; ventral inter-ocular region and interocellar space marked broadly with mummy brown, this with a solid subquadrate to trapezoidal blotch, dorsad briefly and narrowly divided for one-half its median depth, ventrad of this blotch in the males the face is dark punctulate, grouped chiefly across lower part of face and a weak ventro-ocellar lining; in the female sex interocellarly there is a dark transverse ellipse, enclosing a pale area, and connected with ventro-ocellar dark lines, thus forming a more or less evident transverse dark bar, the pale areas of the face also punctulate. Eyes chestnut-brown to fuscous. Antennæ of general color, moderately infumate distad of proximal joint. Pronotum entirely with a fine atomaceous punctulation of russet, slightly more open and less dense on lateral portions, an encircling series of larger punctulations of mummy brown near the pronotal margins, no lyrate pattern indicated mesad. Tegmina with a closely placed, but hardly atomaceous punctulation of dark, a certain number in the anal and discoidal fields true punctæ in size, contrasting with the more minute feature of the pattern, the latter sometimes weakly nebulose distad on the tegmina and exhibiting a tendency to become confluent transversely; humeral trunk with usual punctulation of pattern but no distinct or contrasted lineation. Wings with dark marginal tips to certain of the distal costal veins, the discoidal rami and the median vein. Dorsum of abdomen faintly punctulate with russet laterad; venter of abdomen with a masking atomaceous punctulation and a far sparser series of larger

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Width of Tegmen
♂, San Lorenzo, Dominican Republic, type	17.8	5.2	6.5	18	5.4mm.
♂, San Francisco Mts., Dominican Republic, paratype	16.7	5	6	16.5	5.2
♀, San Francisco Mts., Dominican Republic, paratype	20	5.5	6.5	19.3	6.1
♀, Sanchez, Dominican Republic, allotype	22.5	6.2	7.1	21	6.5

punctulations; in the male both elements far more sparsely indicated than in the female, and the atomaceous one virtually absent proximad. Subgenital plate of male with a weak dextral intermarginal darkening. Limbs with scattered dark punctulations, weak extensor dark lining of femora; points of insertion of larger spines of femora and tibiæ marked with dark.

In addition to the type and allotype we have before us four males from San Lorenzo, the locality of the type, bearing the same data as the latter, except for date, and from The American Museum of Natural History; and two males and two females from the San Francisco Mountains, thirteen kilometers north of San Cristobal,[1] Province of Santo Domingo, Dominican Republic, taken September, 1905, by August Busck, and from the United States National Museum. The San Lorenzo specimens were taken June 24 to 28, 1915. There is little in the way of variation in the series calling for comment, except that the number of proximal large spines on the ventro-cephalic margin of the cephalic femora varies from three to five. The size exhibits appreciable variation in both sexes, as shown by the above table of measurements. The disposition of the larger punctulations of the tegmina shows considerable but relatively unimportant variation, but in no case is the usual lyrate pronotal pattern even weakly indicated by dark markings.

HOMALOPTERYX Brunner

An aggregation of more than a dozen species from the Oriental, Papuan, Australian and Neotropical regions have been placed in this genus by various authors, but it is evident from even the most superficial study of the single West Indian species and one of the Indian species that more than one generic entity is involved. The genus was based on *H. capucina* Brunner, described from Venezuela and Colombia, a species we have not seen, but which was originally well figured. To this the West Indian species is closely related and with it clearly congeneric. There exists, in consequence, some doubt in our minds as to whether true *Homalopteryx* occurs outside of tropical America. Certainly the species with which we are at present engaged is a true *Homalopteryx*, and we would seem justified in suggesting that the Old World forms may eventually prove to be generically distinct.

The epilamprine genus *Rhicnoda* Brunner[2] has been an uncertain factor in the systematics of the subfamily, and it appears very probable that at least a few of the species which have been referred to it belong to other, previously established, genera. The genotype of *Rhicnoda* is *R. rugosa*, an Oriental species, of which female material is before us, and the results of an analysis of the features of *Homalopteryx*, on the basis of *H. laminata*, and *Rhicnoda*, as evidenced by *rugosa*, seem worthy of comment. The main occasion for this note is that *laminata* has been considered a *Rhicnoda* by Saussure and Zehntner,[1] who were followed in this by Kirby.

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[1] See p. 11, footnote 1.
[2] 1893, Ann. Mus. Civ. Stor. Nat. Genova, XXXIII, p. 30, Pl. I, figs. 11*a*, 11*b*.

Rhicnoda	*Homalopteryx*
♀. Interspace between eyes subequal to that between ocellar spots.	♀. Interspace between eyes distinctly greater than that between ocellar spots.
	♂. Interspace between eyes subequal to that between ocellar spots.
♀. Vestigial arolia present.	♂, ♀. Arolia well developed, prominent.
♀. With lateral triangular tegmina.	♀. Without lateral triangular tegmina, completely apterous.

Little is definitely known of the male sex of *Rhicnoda rugosa*, as the specimen so assigned by Brunner was referred with a query. In addition the description is so brief that we are unable to gain desired light on quite a few points. No specimen of the male sex referable to *rugosa* is available for study at this time.

It is evident that *Rhicnoda* and *Homalopteryx* are not widely separated genera, also that their differentiations cannot be fully summarized until the male sex of *rugosa* is definitely known and critically examined. Tentatively, at least, it is clearly best to endeavor to arrange our material in these two genera, as they would appear to be distinguished by the features given above. Whether these differences will stand the test of additional information, and critical examination of all the known species which have been referred to *Rhicnoda*, remains to be determined.

Homalopteryx laminata Brunner

H[*omalopteryx*] *laminata* Brunner, 1892, Proc. Zoöl. Soc. London, p. 204, Pl. xv. fig. 4. ♀; Lot 14 Estate, Château-belais and in forest at 2000 feet, St. Vincent, British West Indies.

The specimens which formed the basis of Brunner's description comprised adult females and immature males, taken at the three localities on St. Vincent given in the above quoted reference. In the forest the collector, H. H. Smith, found the insect in decaying leaves. No West Indian material is in hand, nor has any been recorded by an author other than Brunner, but we are well acquainted with the species, as it occurs in Trinidad and Venezuela, from which regions we have material before us. The sexes differ greatly, the male being fully winged and of a very delicate texture, while the female is apterous, subpatelliform and relatively scabrous.

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[1] 1893, 'Biol. Cent.-Amer., Orth.,' I, p. 69.

CALOLAMPRA Saussure

This genus which bears a relationship to *Epilampra* somewhat similar to that of *Audreia*, but apparently in an antithetical manner, is as far as known at this writing entirely an Old World Group, except for the new species here discussed. Certain New World forms have been referred to the genus in the past, but these associations are now known to have been erroneous.[1] The species of *Calolampra* show marked sexual differences, the males having fully developed tegmina and wings and a general form which suggests both *Epilampra* and the Old World arid land genus *Polyphaga*, while the females are broad and heavy and may either lack tegmina and wings, or may have greatly reduced lobiform or subquadrate tegmina. The sexes presumably have very different habits, the females probably fossorial or at least secretive, while the males may be night fliers, as is the case with many polyphagids. It is most unfortunate that we know nothing as to the exact locality or binomics of the remarkable West Indian member of the genus. The female sex of the latter is a great desideratum, as it doubtless is exceedingly different from the male in general appearance. In the male sex the West Indian species is strikingly similar to the South and East African *C. pardalina* (Walker), of which we have examined both sexes.

Calolampra aliena, new species

Plate XVIII, Figures 5 and 7 to 9

When compared with the male sex of the African *C. pardalina* (Walker), the present species is seen to differ principally in the occipital interspace between the eyes being much narrower, about one and two-third times as great as occipital depth of eye, instead of two and one-half times as in *pardalina*, in the same region being without a transverse elevated line, which is present and produces a distinct angle in *pardalina*, in the less deplanate face, in the cephalic margin of the pronotum lacking the relatively broad subtruncation of *pardalina*, in the more strongly punctate discoidal and anal fields of the tegmina, in the straighter and less arcuate axillary veins of the tegmina, in the more arcuate anal sulcus of the same, in the less produced median section of the subgenital plate, in the short styles of the same, and in the shorter cerci. The dorsal half of the face in *pardalina* is sharply and solidly dark, while in *aliena* there is a far more restricted and less definite pair of dark blotches not extending ventrad of the ocelli.

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[1] Saussure's *Calolampra bispinosa* has been made the type of the genus *Litopeltis* and removed to the Perisphærinæ, while the same author's *brevitarsis* is based in all probability on immature material and possibly represents a species of *Litopeltis*. Other forms described as species of the genus *Calolampra* have since been placed in *Audreia*.

The type of *aliena* has been much damaged in the past and is in such condition that it is dangerous to attempt to spread the tegmina and wings. The limbs are considerably damaged, but fortunately the important cephalic femora are intact.

Type.—Male; Haiti. (P. R. Uhler.) [Museum of Comparative Zoölogy.]

Size medium; form with a polyphagine suggestion, elongate, fully alate.

Head hidden under pronotum when seen from dorsum; cordiform, greatest depth subequal to width across eyes; interocular space extremely broad for the male sex, nearly twice as great as that between ocelli, its surface very weakly inflated on each side, these areas contiguous dorsad; ocelli well impressed, nearly circular, between them is placed a pair of small impressed puncta. Eyes not large, moderately lateral, their occipital margins gently arcuate, juxta-antennal margin of eyes rectangulate. Antennæ weakly hirsute.

Pronotum moderately transverse, subelliptical, greatest length contained one and one-third times in greatest width of same: cephalic margin regularly arcuate with the lateral margins, which are not differentiated; lateral angles narrowly rounded obtuse; caudal margin appreciably but not strongly produced, broadly rounded mesad, very faintly concave laterad: disk with a pair of subarcuate, irregularly spaced depressions outlining the disk, the most evident part of these being paired circular premedian impressions; lateral sections moderately deflexed cephalo-laterad; medio-caudal section with numerous transverse striatulations or folds.

Tegmina surpassing apex of abdomen by more than pronotal length, relatively broad: costal margin faintly sigmoid, gently arcuate proximad and much more strongly rounding to the apex distad: marginal field relatively narrow and elongate, reaching to point equal to two-fifths of entire pronotal length; anal field as extensive as marginal field: venation sharply defined and nervures fewer than in species of *Epilampra;* scapular field with rami of discoidal vein very closely placed; discoidal field with sectors more radiating than usual in genus; anal sulcus regularly arcuate, more flattened proximad; nervures of anal field about eight in number, regularly placed, more radiating than usual, but in general oblique subparallel and not converging distad, intercalary nervures of anal field very weak, thus producing distinct channels between principal nervures of field. Wings equalling tegmina in length; costal veins few, about six in number.

Abdomen relatively broad for the male sex; caudo-lateral angles of tergites bluntly angulate, hardly produced. Supra-anal plate transverse, subrectangulate, distal margin weakly arcuate, caudo-lateral angles well rounded.[1] Cerci depressed, blunt, sub-fusiform, about one and one-half times as long as supra-anal plate. Subgenital plate slightly asymmetrical, distal margin mesad arcuato-emarginate, sinistral angle rounded rectangulate, dextral angle rounded obtuse-angulate; styles very short, simple, relatively equal.

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[1] Lateral portions curled dorsad in drying of type.

Cephalic femora with ventro-cephalic margin having four spaced large proximal spines and a single distal spine, the area between with a sparse series of brief spinules, which are more distant from each other proximad than distad; ventro-caudal margin unarmed except for a pronounced apical spine; caudal tibiæ subequal to half of femora in length, moderately expanded, spines large, moderately curved, talpoid, flattened on flexor surface, several spines placed on external as well as those on extensor and flexor surfaces. Median and caudal femora with ventro-cephalic margin having three (median pair) or two (caudal pair) medium sized spines, also an apical one; ventro-caudal margins of same unarmed except for distal spine on the median pair. Median and caudal tibiæ strongly spined. Caudal tarsi incomplete, metatarsus itself slightly less than one-half as long as tibia, biseriately spinulose ventrad; pulvilli present and apical on all tarsal joints (one to four) remaining.

General base color ochraceous-buff to antimony yellow, passing to pale buckthorn brown on limbs and light ochraceous-buff on venter of abdomen. Dark pattern deep chestnut-brown to fuscous, distad on tegmina passing to russet, the disposition of pattern indicated below. Head virtually without dark punctulations, the interocular and interocellar region with a solid dark area, regularly shading off dorsad, contrasted ventrad with a meso-ventral triangular emargination extending dorsad and dividing the blotch for about two-thirds its depth; eyes pale clove brown; antennæ appreciably infuscate except proximad. Pronotum with a dense and sharply indicated dark pattern of punctulations and blotches, absent from the immediate vicinity of the lateral and cephalic margins, and mesad with a lyrate pattern indicated by blotches, a transverse series of four blotches disposed cephalad of the more lyrate center; vicinity of caudal margin with about ten short radiating lines, which reach to the margin itself. Tegmina with punctulations distinctly pantherine in type, covering virtually all except the pale immaculate marginal field; humeral trunk broadly and heavily infuscated, particularly in distal fourth, distad of this breaking into maculations. Wings appreciably infumate, except that the region of the costal veins is solidly of the pale base color. Abdominal tergites each with a transverse dark bar distad. Tibial spines russet.

Length of body, 16 mm.; length of pronotum, 5; greatest width of pronotum, 6.6; length of tegmen, 21.7; greatest width of tegmina, 7.

The type of this most interesting and remarkable species is unique. The discovery of the female is awaited with great interest.

Panchlorinæ

The Panchlorinæ is a group of cockroaches embracing forms often very diverse in appearance and in general above the average in size. Several of the genera, i.e., *Schizopelia* and *Schistopeltis*, are noteworthy in the Blattidæ by reason of having the pronotum fissate or divided, in the former on each side at the lateral angle, in the latter cephalad on each side of the section dorsad of the head. Of the seventeen or so genera of the subfamily, nine are tropical American, and three (*Leucophæa, Pycnoscelus* and *Nauphoeta*) are circumtropical and subtropical, but beyond doubt two, and probably all three, of these are of Old World origin. One of the American genera (*Panchlora*) is frequently transported in fruit to the United States and more rarely to Europe, but it has never established itself outside of the tropics.[1]

In most of the species of this family there is little difference in the superficial external form of the sexes of one species. The immature condition, however, is often strikingly different, and its association with the adult frequently a difficult matter, so much so that in more than one case the immature stage has been described as a distinct genus.

It is very probable that parthenogenesis occurs in the widely distributed panchlorine genus *Pycnoscelus*, at least in America, though our evidence is entirely circumstantial yet very convincing. In *Panchlora* we find viviparity present, as is also true of certain genera of four other subfamilies of the Blattidæ.

KEY TO THE WEST INDIAN GENERA OF PANCHLORINÆ

1. Caudal margin of pronotal disk distinctly angulate produced mesad, covering the scutellum. Intercalated nervures of tegmina, when indicated, single in each interval between principal veins .... 2.

   Caudal margin of pronotal disk transverse subtruncate, median projection very weak, exposing the scutellum. Intercalated nervures of tegmina generally three (in discoidal field) in each interval between principal veins. (Tegmina coriaceous; pronotum arcuate in transverse section; color never greenish; surface never highly polished.) .... *Nauphoeta* Burmeister.

2. Metatarsal pulvillus extending to or nearly to base of segment. Structure robust .... 3.

   Metatarsal pulvillus distal, circular. Structure delicate. (General color translucent, clear greenish or rarely (in certain species) pale brownish. Body distinctly depressed.) .... *Panchlora* Burmeister.

3. Pronotum subdeplanate, lateral sections not broadly deflexed, but impresso-deplanate latero-cephalad. Tegmina coriaceous, subopaque; surface of pronotum and tegmina dull. Ulnar vein of wing with numerous (15 to 20) rami. (Pronotum and tegmina buffy, with pattern of pitch brown. Size large.) .... *Leucophæa* Brunner.

   Pronotum strongly arcuate in transverse section, lateral portions broadly arcuate deflexed. Tegmina semi-transparent; surface of pronotum and tegmina moderately polished. Ulnar vein of wing with fewer (approximately 10) rami. (Pronotum solid blackish, edged cephalad and laterad with buffy; tegmina chiefly bister of varying depth. Size relatively small.)
   Pycnoscelus Scudder.

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[1] At Brownsville, in extreme southern Texas, a species of this genus is endemic, living under perfectly natural conditions. Brownsville is in an arid tropical region.

Leucophæa maderæ (Fabricius)

[*Blatta*] *maderæ* Fabricius, 1781, 'Spec. Ins.,' I, p. 341. Madeira Islands.

Nauphoeta kükenthali Shelford, 1910, Zoolog. Jahrbücher, Suppl. XI, Heft 2, p. 107. ♂; Loango, near St. Thomas, Virgin Islands.

Bahamas.—Nassau, New Providence Island, 1 ♀, [Brooklyn Inst.].

Cuba.—Baños de Ciego Mantera, VI, 30, 1918, 1 ♀. San Lucas, Baracoa, Oriente Province, 1 ♂, [Davis Cln.]; Baracoa, IV, 1915, 1 immat. ind., [Davis Cln.].

Jamaica.—Kingston, X, 24, 1913, (M. Hebard; in hotel larder), 1 ♂, [Hebard Cln.] Mandeville, Manchester Parish, elev. 2250 feet, I, 16–23, 1920, (F. E. Watson; in hotel), 6 ♂, 6 ♀. Montego Bay, XI, 1–2, 1913, (M. Hebard; on logwood docks), 1 ♀, [Hebard Cln.].

Hispaniola.—Port-au-Prince, Haiti, elev. about 300 feet, I, 15–23, 1922, (F. E. Watson), 2 ♀; III, 5–11, IV, 8–11, 1922, (F. E. Watson), 2 immat. ind. Puerto Plata, Dominican Republic, VII, 6, 1915, (F. E. Watson; on board ship after leaving port), 1 immat. ind. Sanchez, Dominican Republic, V, 11–16, 22–27, VI, 12, 1915, (F. E. Watson; in hotel or in vegetation of royal palms, guava, etc.), 1 ♂, 4 ♀, 1 immat. ind. Saona Island, VII–VIII, 1913, (R. H. N. DeBooy), 1 immat. ind.

Porto Rico.—Manati, Department of San Juan, VI, 29, 1915, (Lutz and Mutchler; at auto lights on road to Ciales), 3 ♀. Rio Piedras, Department of Humacao, II, 24, 1912, (T. H. Jones), 1 ♀, [U. S. N. M.]. Mayaguez, Department of Mayaguez, II, 2, 1912, 1 ♀, [U. S. N. M.]. Baños de Coamo, Department of Ponce, XII, 28, 1914, (H. E. Crampton; at light on hotel veranda), 1 ♀. Culebra Island, II, 1899, (A. Busck), 4 ♂, 1 ♀, [U. S. N. M.].

Dominica.—Laudet, VI, 12, 13, and 22, 1911, (Lutz; under loose bark and banana sheaths and about house), 2 ♀, 1 immat. ind. Long Ditton, VI, 22, 1911, 1 immat. ind.

The synonymy of *Nauphoeta kükenthali* Shelford seems incontestable. The unique male individual on which the name was based was an alcoholic specimen, and probably teneral. The condition of the specimen was probably responsible for Shelford's failure to properly associate it. The description, down to minute details of the second abdominal tergite, the peculiar form of the pronotum and the formula of the apical spines of the femora, as well as the size, fully agrees with male material of *maderæ* from the West Indies.

This widely distributed tropical and subtropical species previously has been reported from a number of the West Indies, and it doubtless occurs in suitable environments through most of the islands. It is a domiciliary species frequenting habitations, warehouses and other structures, at times very abundant and a serious pest. With all of its adaptiveness it apparently spreads rather slowly, as it does not appear to be established anywhere in the warmer portions of the United States, and its presence and distribution in the West Indies probably dates back to the days of the West African slave ships, which may have been the means of transport. Apropos of this Beauvois, in 1805, reported and figured the species (*Blatta major*) as from the "Iles de l'Amerique," probably specifically meaning Hispaniola. He states his belief that the species originated in Africa, and was imported into the colonies (presumably French) in America. In Central America it is of rare and very local occurrence, as is true of a considerable portion of South America. The genus is African, aside from this one species of much wider distribution, which probably has been largely disseminated through human agencies.

The previous West Indian records are from the Bahamas (Morse and Rehn), Grant Town, New Providence, Bahamas (Rehn); Cuba without exact data (Brunner), Guanajay in Pinar del Rio and Havana, Cuba (Rehn); "St. Domingo" (Serville and Walker, also by the latter as *Proscratea? illepida*, based on the immature condition); Jamaica (Walker); Porto Rico (Gundlach); Culebra Island (Rehn); St. Thomas (Shelford); St. Bartholomew (Hahn); Antigua (Marshall); Guadeloupe (Du Buysson)[1]; St. Vincent (Brunner) and Barbados (Rehn).

The immature stages of this species are so distinctive in surface features, form and coloration that no difficulty in their recognition should be encountered.

Pycnoscelus surinamensis (Linnæus)

[*Blatta*] *surinamensis* LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 424. Surinam.

BAHAMAS.—Nassau, New Providence Island, 2 ♀, 3 immat. ind., [Brooklyn Inst.]. New Providence Island, XI, 20, 1912, 1 ♀. Fresh Creek, Andros Island, (W. M. Mann), 1 ♀, [U. S. N. M.].

CUBA.—Twelve and one-half kilometers south of Pinar del Rio, Pinar del Rio Province, IX, 12–13, 1913, (Chas. Leng), 1 immat. ind. Baños de San Vincente, seven kilometers north of Viñales, Pinar del Rio Province, IX, 16–22, 1913, (Lutz and Leng; in various situations), 4 ♀, 4 immat. ind. Fourteen kilometers north of Viñales, Pinar del Rio

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[1] Du Buysson, 1908, 'Orthoptères, Mission Chari-Lac Tchad.,' (1902–1904), Append., p. 708.

Province, IX, 16–22, 1913, (F. E. Lutz; in pine savanna), 1 ♀. Cabañas, Pinar del Rio Province, IX, 5–8, 1913, (Charles Leng; under decayed stalks of sugar cane and siftings in mangrove swamp), 2 ♀. Havana, IX, 5–6 and 9, 1915, 1 ♀, 1 immat. ind. Baños, Santa Clara Province, (Barnum Brown), 1 immat. ind. San Carlos Estate, near Guantanamo, Oriente Province, IV, 2, 1913, (C. T. Ramsden; under log), 3 ♀, 8 immat. ind., [A. N. S. P.]; X, 4–8, 1913, (F. E. Lutz), 2 immat. ind. Baracoa, Oriente Province, II, 5, 1915, 5 immat. ind., [Davis Cln.]. Juaco, Oriente Province, IV, 1915, 4 immat. ind., [Davis Cln.].

HISPANIOLA.—Sanchez, VI, 13–18, 1915, (F. E. Watson; at light), 1 ♀.

JAMAICA.—Montego Bay, St. James Parish, III, 6–16, 1911, (J. A. Grossbeck; under manure, bases of leaves of cocoanut palm, by sifting, etc.), 12 ♀, 30 immat. ind.; X, 28–31, 1913, (M. Hebard; two in bromeliads, others under litter), 4 ♀, 4 immat. ind., [Hebard Cln.]. Palm Beach, Montego Bay, St. James Parish, III, 3–17, 1911, (J. A. Grossbeck; under logs and stones on coral rock), 5 ♀, 2 immat. ind. Mandeville, Manchester Parish, XI, 6–7, 1913, (M. Hebard), 1 ♀, [Hebard Cln.]; elevation 2131 feet, XI, 26–28, 1919, (F. E. Watson; in hotel), 1 ♀, 3 immat. ind. Cumberland District, Clarendon Parish, elev. about 3000 feet, XII, 15–18, 1919, (F. E. Watson), 1 immat. ind. Grange Lane, St. Catherine Parish, X, 25, 1913, (M. Hebard; under limestone boulder), 1 immat. ind., [Hebard Cln.]. Stony Hill, St. Andrew Parish, X, 25, 1913, (M. Hebard), 2 ♀, 2 immat. ind., [Hebard Cln.]. Bath, St. Thomas Parish, III, 9, 1921, (C. C. Gowdey), 1 ♀, [Jamaica Dept. of Agr.].

PORTO RICO.—Playa Sardinera, Mona Island, II, 21–26, 1914, (F. E. Lutz; under wood), 1 immat. ind. Manati, San Juan, VI, 27–29, 1915, (F. E. Lutz and A. J. Mutchler; in rotted log), 1 ♀. Quebradillas, Department of Arecibo, 1, 3, 1915, (H. E. Crampton; under tiles and boards in stable yards), 4 immat. ind. Desecheo Island, II, 18–20, 1914, (F. E. Lutz; sifting in several situations), 1 ♀, 3 immat. ind.

VIRGIN ISLANDS.—St. Croix, (seashore), 1 ♀, [U. S. N. M.].

ST. LUCIA—Castries, IX, 10–22, 1919, (J. C. Bradley), 2 ♀, 2 immature ind., [Cornell Univ.].

This species is of very wide distribution within the tropics and subtropics, and is readily established in greenhouses, etc., in the temperate portions of the world. Adult males of the species are excessively rare, and, as far as known, none have ever been taken under natural conditions in the New World. In the very extensive series before us we have but a single male, this taken on Lombok, one of the Sunda Islands, which has been described by Hebard in his study of the North American Blattidæ.[1] As has been suggested by that author, the species may be parthenogenetic and additional information upon this subject is awaited with great interest. The immature individuals have a very different appearance from the adults, and to the uninitiated would not be recognized as specifically identical with mature material.

The previous records of the species in the West Indies are from the Bahamas (Morse, Rehn), and specifically Grant Town, New Providence (Rehn); it occurs over all of Cuba (Gundlach, Bolivar and Rehn), having been recorded from localities extending from Pinar del Rio Province to the vicinity of Guantanamo; Jamaica (Walker, Rehn); Haiti (Walker and Palisot de Beauvois, and Saussure as *indica*); from Porto Rico by Gundlach, and specifically from Pueblo Viejo and Fajardo (Rehn); St. Thomas (Shelford), Antigua (Caudell), Dominica (Caudell), Guadeloupe (Lherminier), St. Vincent (Brunner), Grenada (Brunner) and Barbados (Rehn, Caudell).

The species will be found hiding under stones and loose trash, while the immature individuals burrow into the ground, frequently leaving the rough and cryptically formed and colored distal portion of the abdomen exposed at the ground surface.

Panchlora Burmeister

The specific taxonomy of the genus *Panchlora* hinges entirely on the disposition made of *Blatta nivea* Linnæus, the first described species referable to the genus. Shelford[2] has presented his conclusion as to the identity of the species. In short this is, that the sole specimen in existence which has any possible claim to being considered the Linnæan type, is a male in the DeGeer Collection at Stockholm. Shelford's reasons for regarding this DeGeerian material, of *nivea* as understood by that author, as the possible base for *nivea* of Linnæus are logical and warranted, and we accept them. The features he has given for the Surinam insect he considers *nivea* are sufficient to enable us to recognize it, and a considerable series is before us. It is, however, not a West Indian species, and no further discussion of it is needed at this writing.

Shelford[3] has shown from the type of *Blatta virescens* Thunberg that this name was based on the same species as *nivea*, while Hebard[4] has conclusively demonstrated that *Blatta chlorotica* Pallas is absolutely unidentifiable. Among the older names applied to forms of this genus is another as yet of uncertain status, i. e., *Blatta viridis* Fabricius, 1775. The type of this is not known to be in existence, and the description has not a single definite feature, either of character or geography, to assist in its location. Shelford[1] has given a single male cercal feature for the insect he calls *viridis*, but on what evidence he assumes the application of the name, no one knows. Without more explicit information we feel the only place for *viridis* is as an unidentifiable species of the genus. Without existing types or type localities to assist, it is hopeless to endeavor to assign these old names in a genus as difficult as any in the Blattidæ.

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[1] 1917, Mem. Amer. Entom. Soc., No. 2, p. 194.
[2] 1908, Trans. Entom. Soc. London, (1907), pp. 456–458, 463–464.
[3] *Vide supra*, p. 463.
[4] 1916, Ent. News, XXVII, p. 220, footnote 4.

The following names have been used for West Indian records of the genus *Panchlora*, which, without actual examination of the material on which the records were based, we are unable satisfactorily to assign specifically. There is a very strong possibility that in most cases they relate to *P. cubensis*, the dominant West Indian species, but their arbitrary reference to that species would hardly be warranted.

P. nivea from "Antilles" (Olivier); Cuba (Girard, Brunner, Bolivar, Gundlach and Saussure and Zehntner); Jamaica (Brown); Porto Rico (Gundlach); Loango near St. Thomas (Shelford); Guadeloupe (Lherminier).

P. viridis from "West Indies" (Burmeister, Saussure); "Antilles" (Bolivar); Cuba (Walker, Girard, Bolivar, Gundlach, Brunner and Saussure); St. Domingo (Walker); Jamaica (Walker); Porto Rico (Gundlach); St. Vincent (Brunner); Grenada (Brunner).

P. virescens from Cuba (Guérin, Saussure and Saussure and Zehntner); Porto Rico (Rehn)[2]; Montserrat (Rehn).[3]

P. exoleta from "Antilles" (Therese von Bayern); Cuba (Saussure and Saussure and Zehntner); Jamaica (Brunner and Bolivar).

P. hyalina from Cuba (Saussure and Zehntner).

P. peruana from Cuba (Saussure and Zehntner).

P. prasina from Cuba (Girard).

The study of the present material shows conclusively the general assumption that black annulations on the antennæ in this genus are characters of permanence and primary importance, is incorrect. The presence or absence of black spots on the tegmina has been found to be unreliable, and the series of *Panchlora cubensis* and *sagax* (which see below) demonstrate as conclusively that the presence or absence of dark antennal annulations is a character to be used with great caution, probably valueless as a general diagnostic features of groups of the genus.

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[1] *Vide supra*, p. 463.

[2] This material consists of a female in such poor condition that its specific reference is hardly warranted.

[3] This material has now passed out of our hands, so re-examination is not possible at this time.

Immature material of the genus, representing at least three instars, is before us from two localities in Cuba, two in Porto Rico and three in Dominica. The specific determination of such material is almost or quite impossible, at least when not accompanied by adult material, and this is the situation with most of the lots. The *Pycnosceloides* condition is well exemplified by this material,[1] but the form of the abdominal segments, and particularly of the supra-anal plate, will prevent confusion with the same stage of *Pycnoscelus*.

Panchlora cubensis Saussure

P[anchlora] cubensis SAUSSURE, 1862, Revue et Magasin de Zoologie, (2) XIV, p. 230. ♀; Cuba.

P[anchlora] poeyi SAUSSURE, 1862, idem., p. 230. ♂; Cuba.

CUBA.—Cabañas, Pinar del Rio Province, V, 18–21, (Palmer and Riley), 4♂, 2 ♀, [U. S. N. M. and A. N. S. P.][2]; IX, 5–6, 1913, (F. E. Lutz), 3 ♂, 2 ♀. Cayamas, Oriente Province, I, 8, II, 28, III, 18 and 31, V, 3, 20 and 31, VI, 6 (E. A. Schwarz), 5 ♂, 4 ♀, [U. S. N. M. and A. N. S. P.][3]; IV, 17, 1905 (George Dimmock), 1 ♂, [M. C. Z.]. Sixty miles west of Santiago, Oriente, (H. M. Hiller), 1 ♂, [A. N. S. P.].[2] Cappara, Oriente Province, II, 20, 1914, (G. N. Wolcott; on cane leaves), 1 ♂, [U. S. N. M.]. Baracoa, Oriente Province, XI, 1915, 1 ♀, [Davis Cln.].

JAMAICA.—Montego Bay, St. James Parish, XI, 1–3, 1913, (M. Hebard; at light), 1 ♀, [Hebard Cln.]: XI–XII, 1913, (C. G. Hussey), 3 ♂, 1 ♀, [Hebard Cln.]. Kingston, St. Andrew Parish, 1 ♀, [A. N. S. P.]. "Jamaica," (H. G. Klages), 3 ♀, [U. S. N. M.].

PORTO RICO.—Aibonito, Department of Guayama, VIII, 14–17, 1914, (H. C. Barber), 1 ♀.

MONTSERRAT.—III–IV, 1894, (H. G. Hubbard), 1 ♀, [U. S. N. M.].

GRENADA.—No exact locality, VI, (A. Busck), 1 ♂, 1 ♀, [U. S. N. M.]. No exact locality, (Mrs. W. E. Broadway), 1 ♀, [Hebard Cln.].

This species is the dominant one of the genus in the West Indies, particularly in the Greater Antilles, and it is also widely distributed in Mexico, Central America and northern South America. It is the one most frequently encountered adventive in the United States, particularly the eastern states, to which it is regularly transported in cargoes of bananas. The characters of the species and some features of its variability have been set forth by Hebard in his study of the North American Blattidæ.[1] That author has there shown the vast amount of divergence of opinion and contradiction in the names given in the literature of the adventive North American records of *Panchlora*, almost all of which really refer to the present insect. The literature of the species as a West Indian insect is far worse in this respect, and we have already referred to the number of records of West Indian *Panchlora* which cannot definitely be referred to any one of the species here recognized, although probably in most every case the present insect is one which was before the recorder.

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[1] 1921, Hebard, Trans. Amer. Entom. Soc., XLVII, p. 144.

[2] Recorded by Rehn (1903, Trans. Amer. Entom Soc., XXIX, p. 284) as *P. peruana*, the locality given in error as "Habana Province." Later that author (1909, Second Rep. Cent. Exper. Sta. Cuba, p. 189), reported the same material as *P. nivea*.

[3] Recorded by Rehn (1909, Second Rep. Cent. Exper. Sta. Cuba, p. 189) as *P. peruana*.

The synonymy of *poeyi* under *cubensis*, established by Hebard,[2] is clearly evident, as the two names were based on opposite sexes of the same insect, *cubensis* having line priority. Where material has been recorded as *cubensis* or *poeyi*, or where a re-examination of the material shows it to be *cubensis*, we have included the references in our geographic summary below. In the other cases, where there is a possibility that *cubensis* might not have been intended, the references have been given above under the generic discussion.

The Aibonito, Porto Rico female has decided dark annuli on the antennæ, present at about distal sixth. The specimen is otherwise perfectly typical *cubensis*, with the interspace between the eyes equal to one-half of the supra-ocellar depth of eye.

The present series well illustrates the size variation in this species, demonstrated by Hebard[3] from Panamanian material. All of the specimens before us are within the extremes given by him, except that the Grenada female surpasses the maximum given for that sex, having the following dimensions: length of body, 21.5 mm.; length of pronotum, 6.5; greatest width of pronotum, 7.9; length of tegmen, 23; greatest width of tegmen, 7.1.

The previous records of *cubensis* and *poeyi* are all of Cuban material, thus the records detailed above from Jamaica, Porto Rico, Montserrat and Grenada are the only positive records of the species from outside of Cuba. The species probably will be found in most all of the islands, as it is common and omnipresent. Gundlach states that Cuban members of the genus live by preference under the loose bark of trees, while Hebard found this species attracted to lights at night.

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[1] 1917, Mem. Amer. Entom. Soc., No. 2, pp. 198–199, 270–271, Pl. VIII, figs. 2–5.
[2] 1916, Ent. News, XVII, p. 220.
[3] 1919, Mem. Amer. Ent. Soc., No. 4, p. 105.

Panchlora antillarum Saussure

Plate XIX, Figures 5 to 7

P[*anchlora*] *antillarum* Saussure, 1862, Revue et Magasin de Zoologie, (2) XIV, p. 230. Sex? (later given as female minus the end of the abdomen); Cuba.

Hispaniola.—Higural, Dominican Republic, IV, 10, 1913, (J. R. Johnston), 1 ♂, 1 ♀, [U. S. N. M.]. Villa Rivas, Dominican Republic, VI, 22, 1915, (F. E. Watson; in cultivated grounds, palms, fruit, etc.), 1 ♀. Sanchez, Dominican Republic, VI, 7–12, 1915, (F. E. Watson), 1 ♀.

The specimens here recorded have necessitated thorough consideration of the literature, and their reference to *antillarum* has been decided upon only after considerable deliberation. Saussure's *antillarum* was described from a single individual, of which the sex was not indicated, but subsequently Saussure tells us that it was a female, although at a later writing Saussure and Zehntner state it was minus the abdomen. The principal features originally emphasized were the great interval between the eyes, the caudal margin of the pronotum much angulate, the lateral margins of the pronotum opaque and green and the tegmina little surpassing the abdominal apex. The length, with tegmina, was said to be twenty millimeters. In 1864, Saussure[1] somewhat elaborated his previous description, bringing out the fact that the pronotum is more inflated, when compared with the *nivea* type, and that the eyes are separated by an interspace almost a millimeter wide. In 1893, Saussure and Zehntner[2] supplied a few additional remarks, briefly amplifying what had previously been stated, and also given important measurements of the pronotum, Apparently Saussure had never seen any material of the species other than the type, as in 1893 Saussure and Zehntner speak solely of the type.

It is evident that in at least one feature the original description and that of 1864 have presented a condition which exists in no normal *Panchlora*, i. e., the posterior margin of the pronotum "acute angulato" (1862), or with "un angle vif, nullement arrondi" (1864). In 1893, this margin is said to be "postice angulatum." It is evident the condition described originally is not a normal one for this genus, as from our experience with forms of *Panchlora* the angle of the margin in question is rounded and never acute. It is possible the scutellum might have been mistakenly described as the apex of this marginal angle, or that the type is an abnormality. The great interval between the eyes, equalled in no West Indian form and found in both sexes, is an important diagnostic feature of this species, even considering the known variability of this character in *P. cubensis* and other species. The opacity of the lateral margins of the pronotum is an uncertain feature, as its absence is frequently due to a rather teneral condition of the specimen, and also the strength of the green coloring of the heavy chitin in this genus is a matter of variation. The large pronotum, however, combined with stocky build and relatively short tegmina, is diagnostic when considered with the great interocular space.

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[1] 'Mém. Mex. Blatt.,' p. 193.
[2] 'Biol. Cent.-Amer., Orth.,' I, p. 94.

Hebard, in 1916, believed[1] *antillarum* to be an evident synonym of *cubensis*, but this conclusion was reached before the present material was in our hands, and but a single pale green species from the Greater Antilles was before him.

Compared with *P. cubensis* the present species can be distinguished by the greater interspace between the eyes, proportionately heavier and broader pronotum, relatively shorter tegmina and wings and distinctive male genitalia. The latter are shown in Plate XIX, figure 6, while the male genitalic features and the interocular space of both sexes of *cubensis* have been well figured by Hebard.[2]

The published measurements and those of the present individuals are as follows.

	Length of Tegmina	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen
♀, Cuba, type, *ex* Saussure, 1862	20	....	....	....	... mm.
♀, Cuba, *ex* Saussure, 1864	19.5	16	....	....	16.2
♀, Cuba, *ex*, Saussure and Zehntner, 1893	21	....	5.5	7	16.5
♀, Rivas, Dominican Republic	20.5	17	5.6	7.1	17.3
♀, Sanchez, Dominican Republic	24.3	18.5	6	7.5	20
♀, Higural, Dominican Republic	23	21	5.5	6.9	19.5
♂, Higural, Dominican Republic	17.5	17	4.6	5.8	14.2

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[1] Entom. News, XXVII, p. 220, footnote 6.

[2] 1917, Mem. Amer. Entom. Soc., No. 2, Pl. VIII, figs. 3, 4 and 5.

No author since the time of the original description, except the original describer and himself and Zehntner, has added anything to our knowledge of this species. Subsequent records of it from Cuba are mere quotations or repetitions of the original, except that Bolivar states it occurs in Durango, Mexico, which we are inclined to doubt. Whether any of the numerous records of *peruana*, *exoleta*, *poeyi*, *viridis*, *virescens* and *nivea* from the West Indies relate to *antillarum*, as here understood, we are unable to say.

The species may be peculiar to Cuba and Hispaniola and, on the former island, it may be of very limited distribution, but not a single exact locality is known for it other than those here given.

Panchlora sagax, new species

Plate XIX, Figures 1 to 4

More closely allied to *P. peruana* Saussure and *P. colombiæ* Hebard than any other species not possessing black lineations on the pronotum. Our interpretation of *peruana*, described from Moyabamba, Peru,[1] is from individuals of both sexes from Chanchamayo, Peru, and in the collection of the Academy of Natural Sciences of Philadelphia. From these *sagax* differs in the slightly more prominent lateral angles of the pronotum, slightly less produced caudal angle of the same, the proportionately shorter tegmina and wings, and distinctive genital features of both sexes.

To *colombiæ*, *sagax* is closely related, but it differs in the distinctive genital features in both sexes, particularly in the male, and the shorter tegmina and wings. The male genitalic features of *colombiæ* were figured by Hebard in the plates accompanying the original description.[2]

TYPE.—Male; Long Ditton, near Roseau, Dominica, West Indies. June 20, 1911. (F. E. Lutz; at light in house.) [American Museum of Natural History.]

Size medium; form more robust than usual in genus; surface as usual for genus.

Head from dorsum very narrowly visible cephalad of pronotum. Facial aspect with head broad; eyes large; interspace between eyes narrow, equal to one-fourth of supra-ocellar depth of eye.

Pronotum moderately transverse, greatest width slightly greater than median length: cephalic and lateral margins cephalad of point of greatest width strongly and quite regularly arcuate; lateral angles obtuse, but with a distinct and narrowly rounded angulation; caudal margin arcuate obtuse-angulate, mesad not at all produced; lateral portions of pronotum relatively broad, but moderately deflexed.

Tegmina and wings surpassing apex of abdomen by distance equal to greatest depth of head.

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[1] 1864, Rev. et Mag. de Zool., (2) XVI, p. 342.

[2] 1919, Trans. Amer. Ent. Soc., XLV, p. 115, Pl. XVIII, fig. 3.

Supra-anal plate sub-rectangulate transverse; distal margin subtruncate, laterad rather broadly arcuate to lateral margins of plate, mesad with slight and shallow, though relatively broad, emargination. Cerci simple, subdepressed, tapering, surpassing distal margin of supra-anal plate by about one-third of cercal length; ultimate joint enlarged, apex rounded; penultimate joint very faintly longer than antepenultimate one. Subgenital plate moderately asymmetrical, obliquely sinuato-truncate dextrad, sinistrad and distad moderately subundulato-arcuate, as shown in figure 1; styles simple, about one-half length of cercus.

Tibiæ strongly spined; caudal tibiæ with longest distal spine falling but little short of apex of caudal metatarsus. Caudal metatarsus slightly longer than remaining tarsal joints combined.

ALLOTYPE.—Female; Laudet, Dominica, West Indies. June 12, 1911. (Miner; from rotten wood and wood powder.) [American Museum of Natural History.]

The following features are those of difference from the description of the male.

Interspace between eyes equal to four-fifths of supra-ocellar depth of eye.

Supra-anal plate with margin regularly arcuate, mesad deeply fissate, margins of fissation sharply rounded into general plate outline. Cerci tapering, falling short of distal margin of supra-anal plate, ultimate joint moderately elongated, apex rounded. Subgenital plate broad, very ample, margin in general broadly arcuate, faintly concave ventrad of cerci, mesad the margin is rather broadly subtruncate.

General color of the clear thalassine green usual in the species of the genus, in the areas of concentrated pigment being paris green of Ridgway ('Color Standards'). Pale lining of humeral trunk of tegmina and pronotal continuation of same found in numerous species of the genus, not at all indicated. Head light ochraceous-buff; interspace between eyes english red (Ridgway) to mars orange; antennæ buffy at base, passing to pale zinc orange, with or without dark annulus embracing two to four joints at distal fifth or sixth; eyes mottled bister and dresden brown.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen
♂, San Juan, Porto Rico	10.3	3.6	4.4	12.2 mm.
♂, Rio Piedras, Porto Rico	12.5	3.7	4.8	13.3
♂, Culebra Island, Porto Rico	11.5	3.8	4.6	11.7
♂, Long Ditton, Dominica, type	14.1	4	5	14
♂, Long Ditton, Dominica, paratype	15	4.4	5.7	14.8
♀, Rio Piedras, Porto Rico	15.4	4.3	5.7	15.6
♀, Rio Piedras, Porto Rico	15	4.1	5.4	15
♀, Laudet, Dominica, allotype	20	5.7	7.2	19.6
♀, Long Ditton, Dominica, paratype	16.8	5.4	6.6	18

In addition to the type and allotype we have before us the following material.

San Juan, Porto Rico, 1907, (P. Serre), 1 ♂, [Paris Museum].

Rio Piedras, Department of Humacao, Porto Rico, V, 1, (G. N. Wolcott; at light), 1 ♂, [Porto Rico Department of Agriculture.].

Loiza, Department of Humacao, Porto Rico, (bred at Rio Piedras, XI, 16, 1922, from female taken at Loiza in rotten cocoanut palm), 2 ♀, [Porto Rico Department of Agriculture].

Adjuntas, Department of Aguadilla, Porto Rico, IV, 12, 1900, (C. W. Richmond), 1 ♀, [U. S. N. M.].[1]

Aibonito, Department of Guayama, Porto Rico, VII, 14–17, 1914, (H. G. Barber; beating), 1 ♀.

Culebra Island, Porto Rico, II, 1899, (A. Busck), 2 ♂, 2 ♀, [U. S. N. M.].[2]

Dominica, VI–VII, (H. W. Foote; Yale Dominican Exped.), 1 ♂; (A. H. Verrill), 1 ♀, [U. S. N. M.].[3]

Long Ditton, near Roseau, Dominica, VI, 18–20, 1911, (Lutz and Miner; at light in house, and from decaying stump in banana patch), 4 ♂, 2 ♀, *paratypes*, [A. M. N. H., A. N. S. P., and Hebard Cln.].

Laudet, Dominica, VI, 12 and 13, 1911, (Lutz and Miner; in rotting wood), 1 ♂, 5 ♀, *paratypes* [A. M. N. H., A. N. S. P., and Hebard Cln.].

This interesting species is apparently of South American origin and probably its line of migration or extension has been northward through the Lesser Antilles. The genitalic features of the male are quite distinctive, and in that sex no great difficulty should be encountered in the recognition of the species, when proper allowance is made for the exasperatingly similar general form and coloration of the greenish species of the genus.

The size is seen to be variable, although it would seem that material from Dominica is uniformly larger than individuals from Culebra and Porto Rico. The two females from Dominica measured above represent the extremes of the series of that sex from the island, but the minimum may be abnormally small, as it is a dried alcoholic specimen and slightly shrunken. The interspace between the eyes in the male sex varies from as much as one-third to as little as one-seventh of the supra-ocellar depth of the eye, while in the female its range is more limited—from four-fifths as great as to slightly more than this depth of the eye. The male genitalic features are quite constant, although specimens dried and discolored from alcohol, one from Culebra and the other from San Juan, Porto Rico, exhibit a curling of the supra-anal plate which is quite deceptive at first glance. Careful examination, however, shows this is due to the condition of the specimen, and in the remaining Culebra male, which has not been immersed, the supra-anal plate is undistorted and identical in form with that found in Dominica males.

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[1] Recorded by Rehn as *P. hyalina* (1903, Trans. Amer. Entom. Soc., XXIX, p. 285).

[2] Recorded by Rehn (1903, Trans. Amer. Entom. Soc., XXIX, p. 131) as *P. peruana* and *exoleta*, which species, as far as material now available is concerned, are not found in the West Indies.

[3] Recorded by Caudell (1914, Proc. U. S. N. M., XLVII, p. 491), as *P. hyalina*.

An analysis of the specimens before us, possessing sufficiently complete antennæ to be useful in determining the constancy of the presence of blackish annuli on the same, shows the results tabulated below. We have indicated those dried from alcohol in order to show that this condition has not been responsible for the presence or absence of these markings.

Rio Piedras, Porto Rico. One male—Annuli.
Rio Piedras, Porto Rico. One female—Annuli.
Adjuntas, Porto Rico. One female—Annuli.
Culebra Island. One male—No annuli.
Culebra Island. One female—Annuli.
Dominica. One male—Annuli.
Dominica. One female—No annuli.
Long Ditton, Dominica. One male—No annuli. (Alc.)
Long Ditton, Dominica. One male—No annuli.
Long Ditton, Dominica. One female—Annuli. (Alc.)
Long Ditton, Dominica. One female—No annuli. (Alc.)
Laudet, Dominica. One male—No annuli.
Laudet, Dominica. One male—No annuli.
Laudet, Dominica. One female—Obscure annuli present. (Alc.)

It will be seen from the above that neither sex, condition of specimen, nor general locality appear to be correlated with this feature, which can only be considered one of individual variation.

Nauphoeta[1] **cinerea** (Olivier)

Blatta cinerea Olivier, 1789, 'Encycl. Méthod.,' IV, p. 314. Isle of France-Mauritius.

Hispaniola.—Sanchez, Dominican Republic, VI, 7–12, 1915, (F. E. Watson), 1 ♂.

This quite prettily marked species is of wide distribution within the tropics of both hemispheres. In America it is known from the Galapagos Islands and Mazatlan, Mexico, on the west, and several localities in Brazil, "Mexico," Cuba and Hispaniola. Walker in 1868 recorded the species from the latter island, without exact locality, while it was recorded from Cuba by Saussure as long ago as 1864. The only exact Cuban records are from Havana and Cardenas, both given by Gundlach. Doubtless when our knowledge of the West Indian Blattidæ is more complete the present insect will be found to occur in a number of the islands, as it appears to be readily transported by commerce, and of sufficient adaptability to establish itself thoroughly in a new environment. The genus is an African one and the original home of the species was probably Ethiopian or Malagasian.

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[1] Relative to the status of *Nauphœta kükenthali* Shelford (1910, Zoolog. Jahrbücher, Suppl. 11, Heft 2, p. 107), described from the island of Loango, near St. Thomas, Virgin Islands, reference is made to our comments under *Leucophæa maderae*, of which *kükenthali* is clearly a synonym.

Nauphoeta occidentalis (Fabricius)

[*Blatta*] *occidentalis* Fabricius, 1793, 'Entom. Syst.,' II, p. 7. "In Americæ Insulis."

As Shelford has already shown[1] from an examination of the type of *occidentalis* in the Copenhagen Museum, this species is the same as that much more recently described as *Rhyparobia rufipes* Kirby, and is a West African insect. The type bears a written label, "St. Thomas Is.," and Shelford suggests the West African island of San Thomé was intended, and that Fabricius confused this with St. Thomas of the Virgin Group of the West Indies. Fabricius credits the material of Dr. Pflug, who placed in his hand, as witnessed by a perusal of Fabricius' pages, collections from localities as diverse as Tranquebar, East Indies, China, Sierra Leone, Copenhagen and "Insulæ St. Crucis Americæ." We are unable to secure any definite information regarding Dr. Pflug, but it is evident from the above localities that he possessed material from St. Croix and also West Africa (Sierra Leone), in fact the majority of the acknowledgements to him are records of the latter category. As further evidence of the clearly West Indian source of at least some of his material, the late Dr. Henry Skinner called our attention to the case of the hesperiid butterfly *Atrytone vitellius* (Fabricius), reported originally from the same region as *Blatta occidentalis*, and credited to Dr. Pflug. This species is, as far as known to-day, restricted to the Virgin Islands, and a figure of the type of Fabricius in the British Museum fully agrees with material from St. Thomas and St. Croix taken by modern collectors. This evidence is presented merely to show it cannot be assumed the locality is incorrect, although we feel the original material did not come from the West Indies. On the other hand, if introduced from Africa into the Virgin Islands as long ago as the latter part of the eighteenth century, in all probability the species would have spread or specimens would have been secured since, in view of the known adaptability of the related *N. cinerea*. It also is more than possible the original material came from Sierra Leone and was confused with specimens from St. Thomas, West Indies, before passing into the hands of Fabricius. Until more is known concerning the species as a West Indian insect it would seem best to present the evidence and withhold comment.

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[1] 1908, Trans. Ent. Soc. London, p. 468.

In addition to the species of the Panchlorinæ treated above, three South American members of that subfamily have been credited to Cuba, on the bases of old records which we feel are, beyond any question, erroneous, or are of accidental importations which did not become established. We believe that certain series possessed by some of the earlier authors were erroneously labelled as from Cuba. The frequency with which this situation has been encountered, in the case of species since unreported from that island, more firmly establishes this conclusion. This is particularly true of a number of species reported by Guérin-Méneville in La Sagra's great work.

Tribonium spectrum (Eschscholtz)

Blatta spectrum Eschscholtz, 1822, 'Entomographien,' p. 85. Santa Catharina, Brazil.

This species is a native of Southern Brazil and Paraguay. Serville[1] credited the synonymous *Blatta conspersa* to Cuba, citing material in the collections of Lefebvre, Dejean and himself. Probably the original source of all was the same, as no subsequent author has given any additional Cuban information. Guérin-Méneville states he did not have the species from Cuba; Saussure, in 1864, remarks that it was probably imported into Cuba from Brazil, while Gundlach states, "Neither I, nor any other collector has observed this species in this island." All other mentions of the species as a Cuban insect are evidently mere uncommented citations of Serville's record.

Zetobora emarginata Burmeister

Z[*etobora*] *emarginata* Burmeister, 1838, 'Handb. der Entom.,' II, Abth. II, pt. 1, p. 511. [♂]; Pará, Brazil.

Hebard[2] has recently established the synonymy of *Zetobora cicatricosa* Burmeister with *emarginata*, the two names being based on sexes of the same insect. Guérin-Méneville[3] recorded this species from Havana, Cuba, on the basis of a specimen said to have been taken by Poey. This record is quoted by Brunner in 1865 and given as Cuba by Walker in 1868, but Bolivar in 1888 states, "I have not seen in nature this species, which also inhabits South America." Gundlach's comment is more to the point. "It is very probable that it does not exist in Cuba." The species is one of the Guianas and Amazonian Brazil.

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[1] 1839, 'Hist. Nat. Ins., Orth.,' p. 89.

[2] 1921, Proc. Acad. Nat. Sci. Phila., 1921, pp. 209.

[3] In La Sagra, 1857, 'Hist. Phys. Polit. et Nat. l'Ile de Cuba, Anim. Artic.,' p. 336.

Schizopelia fissicollis (Serville)

Blatta fissicollis Serville, 1839, 'His. Nat. Ins. Orth.,' p. 85. Cayenne.

This very remarkable blattid, which possesses a pronotum having lateral fissations, is an inhabitant of the Guianas. Guérin-Méneville in his discussion of *Blatta cicatricosa*, comments upon the synonymy of *fissicollis* under *cicatricosa* (*Zetobora emarginata*), as had been suggested by Serville, shortly after describing *fissicollis*. Guérin-Méneville there reached the conclusion the two insects were very different and, to show the difference between them, gave a figure of each.[1] Unfortunately he failed to mention where his individual of *fissicollis* was from, merely stating, "je possède et représente ici un exemplaire de la vraie *Bl. fissicollis* Serville, et réellement il n'y a aucun rapport entre elle et la *Cicatricosa*." After this follows in a separate paragraph, "Cette espece m'a été envoyeé de la Havane par M. Ph. Poey. . . ." The last statement is unfortunately rather ambiguous, and it has produced considerable confusion and error. Logically, it applies to *cicatricosa*, and so we have considered it above, but it has been used as a basis for the occurrence of *Schizopelia fissicollis* in Cuba. Brunner[2] began the confusion by recording *cicatricosa* from "Havane (Guér.)," and also crediting, *fissicollis* to the "Île de Cuba (Guér.)." Bolivar, in 1888, comments, "La *Z. fissicollis* Serv. signalée par Guérin a l'île de Cuba et figurée sur la pl. 12, fig. 7, de l'ouvrage de La Sagra, ne se trouve pas à Cuba." Hebard[3] has commented upon the incorrectness of the Cuban record of *fissicollis*.

Blaberinæ

A cursory study of the genera referred to this subfamily shows conclusively that the usual arrangement of them is in large part incorrect, as it is quite evident that we have at least three lines of development or phyla, which are as follows: (1) comprising *Archimandrita*, *Blaberus* and *Eublaberus*; (2) comprising *Blaptica*, *Byrsotria*, *Hemiblabera*, *Aspiduchus* (described below) and *Monachoda*; (3) containing *Monastria* and *Petasodes*. The first group is well defined, although relationship with *Byrsotria* is evident. The tegmina and wings are always well developed, the pronotum elliptical and the caudal margin of the same never straight. The second group is well defined from the first, but whether *Monachoda* should be considered the maximum differentiation of the second group, or a less highly modified member of the third one, is a matter of opinion. The second group has the tegmina and wings greatly reduced in the female, or in both sexes (*Hemiblabera* and *Aspiduchus*), the pronotum transversely truncate caudad in the female or in both sexes (*Hemiblabera* and *Aspiduchus*), while a progressive flattening of the pronotum reaches its maximum condition in *Aspiduchus*. *Monachoda* has fully developed tegmina and wings in the male sex and a greatly depressed pronotum, which, however, retains a generally acute elliptical form. The third division is characterized by possessing fully developed alar organs in the male sex (*Monastria*) or in both sexes (*Petasodes*), and also a cucullate pronotum, which in *Petasodes* is remarkably developed. The genus *Cacoblatta* Sasussure is unknown to us, and at this time we do not care to hazard an opinion as to its position.

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[1] Idem, Pl. XII, figs. 5 (*cicatricosa*) and 7 (*fissicollis*).

[2] 1865, 'Nouv. Syst. Blatt.,' pp. 291–292.

[3] 1921, Proc. Acad. Nat. Sci. Phila., 1921, p. 209.

The linear arrangement we prefer to follow is: *Archimandrita*, *Blaberus*, *Eublaberus*, *Blaptica*, *Byrsotria*, *Hemiblabera*, *Aspiduchus*, *Monachoda*, *Monastria* and *Petasodes*.

KEY TO WEST INDIAN GENERA OF BLABERINÆ

1. Both sexes fully winged. Pronotum with caudal margin convex in the female sex. (Pronotal form similar in both sexes, transversely ovate-elliptical.) *Blaberus* Serville.

   Female sex always with tegmina not exceeding middle of dorsum of abdomen; male sex fully alate or with alar organs as in female. Pronotum of female with caudal margin transversely truncate.......................... 2.

2. Pronotum of male differing from that of female, transverse ovate-elliptical in shape. Pronotum of female semicircular in outline. Tegmina and wings of male surpassing, equalling or falling somewhat short of apex of abdomen. (Tegmina of female sharply docked, transversely sinuato-truncate distad.) *Byrsotria* Stål.

   Pronotum of male similar to that of female, semicircular in outline. Tegmina abbreviate in both sexes, not surpassing the middle of the abdomen...... 3.

3. General form and particularly pronotum not strongly deplanate. Tegmina not reaching to middle of abdomen, distal margin transversely subtruncate to weakly oblique (♂) or markedly oblique subtruncate (♀). Marginal field of tegmina proximad equal to one-third of greatest width of tegmen. Cephalic tibiæ relatively heavy, subfossorial in type....... *Hemiblabera* Saussure.

   General form and particularly pronotum strongly deplanate. Tegmina reaching to middle of abdomen, distal margin well arcuate. Marginal field of tegmina proximad equal to almost one-half of greatest width of tegmen. Cephalic tibiæ more slender, cursorial in type.............. *Aspiduchus*, new genus.

Blaberus Serville

Like many other genera the forms of which are variable and the specific features hard to ascertain and express, the genus *Blaberus* has been a despair to the systematist. The first really constructive work was done by Hebard,[1] and his studies in 1916 made it possible to approach certain species of the genus with the realization that the confusion of the past had to an extent been dissipated. Some finality in nomenclature has now been achieved, certain of the species clearly defined and in a measure intra-specific variation in the genus ascertained.

It is evident from the material in hand, and from a study of the literature, that we have but two species of the genus in the West Indies, although the literature credits nine specific names to the fauna of those islands. Some of these are synonyms, others based on material not West Indian (as Saussure's record of *minor*), while a number are erroneous identifications, which it is now possible to correct. The two West Indian species are of considerable interest, in that one (*craniifer*) is known from Cuba and elsewhere, Mexico southward through Central America, while the other (*discoidalis*) is known from all the Greater Antilles and northern South America, west to Panama. It would seem that the two species reached the Greater Antilles by opposite routes, and that *craniifer* is probably the more recent arrival.

From the Lesser Antilles we have no material of the genus, or for that matter any record of value. Lherminier, in 1837, reported by name only, *Blatta gigantea* from Guadeloupe, but what species was intended is very doubtful, as at the time that specific name was used for almost any member of the genus.

One specific name has figured to a considerable extent in the literature of West Indian *Blaberus*, which certainly has no real claim to be so included. This is *Blatta* (*Blabera*) *sulzerii* Guérin.[2] The name was based on a single individual supposed to be from Cuba, and also considered to be identical with that figured, in 1776 by Sulzer, and then said to be from Surinam. Sulzer's figure,[3] Guérin's description and Saussure's redescription and figure of Guérin's type in the Geneva Museum[4] show conclusively that *sulzerii* is a member of the genus *Eublaberus* Hebard,[5] a Central American and South American group, no member of which is known from the West Indies. Added weight is thus given to the very questionable character of a number of Guérin's supposed Cuban records, quite a few of which point to the Guianas, and possibly Cayenne, as their probable source. In consequence we are not considering *sulzerii* as a West Indian insect.

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[1] 'Critical Notes on Certain Species of the Genus Blaberus (Orthoptera, Blattidæ),' 1916, Entom. News, XXVII, pp. 289 to 296, Pl. xv. 'The Blattidæ of North America North of the Mexican Boundary,' 1917, Mem. Amer. Entom. Soc., No. 2, pp. 200 to 205.

[2] In La Sagra, 1857, 'Hist. Phys. Polit. et Nat. Île Cuba, Anim. Artic.,' p. 334.

[3] *Blatta surinamensis* Sulzer (not of Linnæus) 1776, 'Abgekurzte Geschichte der Insekten,' I, p. 77, Pl. viii, fig. 1.

[4] 1864, Mém. Hist. Nat. Mexiq., I, pt. 3, p. 239, Pl. ii, fig. 39.

[5] 1920, Mem. Amer. Entom. Soc., No. 4, p. 116.

The two West Indian *Blaberus* may be separated by the following features.

Size smaller; form robust. Pronotum proportionately larger compared with general bulk. Pronotal maculation solid, without pale areas. Tegmina with internal boundary of marginal field weakly sigmoid; width of marginal field no more than one-half of greatest width of anal field; pale areas of tegmina not limited to proximal portions of marginal and anal fields; entire anal field pale even in darkest individuals. (Greater Antilles, northern South America, Panama.) *discoidalis* Serville.

Size larger; form less robust. Pronotum proportionately smaller compared with general bulk. Pronotal maculation with small pale areas which form a pattern crudely resembling a human face (rarely absent). Tegmina with internal boundary of marginal field markedly sigmoid; width of marginal field more than one-half of greatest width of anal field; pale areas of tegmina limited to proximal portions of marginal and anal fields, and occasionally an area mesad in discoidal field. (Cuba, Mexico and Central America.)............*craniifer* Burmeister.

Blaberus discoidalis Serville

Plate XIX, Figure 8

Blabera discoidalis Serville, 1839, 'Hist. Nat. Ins., Orth.,' p. 76, Pl. I, fig. 6. ♀; Santo Domingo.

Hispaniola.—Puerto Plata, III–V, 1916, V, 7–8, VII, 6, 1915, (F. E. Watson and N. L. Orme, Jr.; taken in houses and on board ship), 1♂, 2♀. Fortaleza San Luis, Santiago [de los Caballeros], II, 2, 1919, (H. B. Sherman), 1 ♀, [Mus. Zool. Univ. Mich.].

Jamaica.—Kingston, VIII, 1, 1913, (Wm. Harris), 2♂, 5♀, [Hebard Cln. and U. S. N. M.[1]]. Ferry River, Liguanea Plain, VII, 5, 1920, (Rehn; under dead cocoanut petioles in open spot), 1♂, 1 immature ♀, [A. N. S. P.].

The synonymy of this species has been carefully studied by Hebard, to whose paper[2] the student is referred for the detailed information. The names *Blabera cubensis* Saussure and *Blabera rufescens* Saussure and Zehntner, as well as part of *Blabera varians* Serville (♂), and *subspurcata* Walker, refer to this species.

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[1] Reported by Hebard, 1916, Entom. News, XXVII, p. 294.
[2] Idem, p. 296.

Discoidalis is the most widely distributed species of *Blaberus* in the West Indies, being known from all of the Greater Antilles and Vieques Island. The records have been so confused that it is best to cite them with the identifications there given. We have examined all of them and satisfied ourselves of the correctness of the association here made. The previous general records are from Cuba (Serville as *varians*, Brunner as *trapezoidea*, Saussure as *cubensis* and *trapezoidea*, Bolivar and Gundlach under the same names, Saussure and Zehntner as *trapezoidea* and *rufescens* and Rehn [solely from the literature] as *trapezoidea*, *cubensis* and *rufescens*); Jamaica (Drury as *gigantea*, Brunner as *atropos*); Hispaniola (Serville as *discoidalis* and *atropos*, Walker as *subspurcata*); Porto Rico (Rehn as *rufescens*, Sein and Wolcott as *discoidalis*, Wolcott as *cubensis*). Gundlach specifically reported the insect from Magua, in the valley of Trinidad, Cuba, while Hebard has credited it to Vieques Island. Its range elsewhere extends from Panama eastward through Colombia and Venezuela to the island of Trinidad.

Hebard has given extensive notes on the size and color variation of the species.[1] All we know concerning the habits of the species in the West Indies is that Gundlach found it under stones in a field near a sugar mill at Magua, Cuba; Rehn secured it from under dead cocoanut palm litter along the Ferry River, Jamaica; Sein states it is encountered in houses in Porto Rico, in company with *Leucophaea maderæ*, while Wolcott reports it as taken in a banana ripening room in a fruit store in the same island.

Blaberus craniifer Burmeister

Bl[abera] craniifera Burmeister, 1838, 'Handb. der Entom.,' II, Abth. 2, pt. 1, p. 518. Cuba.

This species is part (♀) of *Blabera varians* of Serville, as Hebard has shown.[2] It has generally been recorded as *atropos* of Stoll, which, however, is a South American species closely related but quite distinct, as has been demonstrated.[2]

The species as a West Indian insect is known only from Cuba, where it is quite common and generally distributed, being particularly abundant in houses in the cities of Santiago and Havana. Gundlach states that in Havana it is called "Cucaracha del Rostro Divino," or Cockroach of the Divine Face, from the pronotal pattern. Guérin, in 1857, recorded it, under the name *atropos*, as common about Havana, and Saussure similarly reported it from the same city. Rehn listed the species, as *atropos*, from Santiago de Cuba, Oriente, and Mariel, Pinar del Rio, while Hebard has reported it from Santiago de las Vegas, Havana Province. The older records from Cuba without exact localities were as follows: Brunner as *fusca* (Cuban record only); Bolivar, Gundlach and Saussure and Zehntner as *atropos*, and Rehn as *fuscus*, the latter solely a literature quotation.

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[1] Idem, pp. 295 to 296.

[2] 1917, Mem. Amer. Entom. Soc., No. 2, pp. 201 to 202.

Outside of the island of Cuba the species is known from Key West, Florida (probably introduced from Cuba), and a continental area extending from southern Mexico and Yucatan to British Honduras.

The characters and general variation of the species have been discussed and the insect figured by Hebard.[1] Occasionally specimens of the extremely recessive type of coloration show a far greater amount of buff on the tegmina than is true of the more usual conditions, and these specimens bear a somewhat different colorational appearance. However, such individuals are scarce, and the only one we have seen is from Meridá, Yucatan, while the other differential features given in the key will readily distinguish such pale specimens from those of *discoidalis*. The pale "face" markings of the pronotal disk are indicated in every specimen seen except one male from Tekanto, Yucatan, which otherwise is fully typical of the species.

Byrsotria Stål

This genus is restricted in distribution to the island of Cuba, and is composed of two species, one of which is described as new in the present study. The species are ground-dwelling, hiding under stones and other shelter. Unlike in *Blaberus*, there is considerable difference between the sexes, the female always having abbreviate and subquadrate tegmina, non-functional wings, and a relatively large pronotum, which has its greatest breadth caudad, while the male sex possesses functional but frequently relatively short alar organs.

The two species may be distinguished by the following features.

Male: general colors above, deep maroon and black, buffy on broad lateral and cephalic sections of pronotum; head relatively narrower, more trigonal; pronotum subpentagonal in outline, distinctly smaller, with dark suffusion covering greater portion of disk and caudal section; tegmina distinctly more coriaceous and less blaberine in character. Female: general form more ovoid, with greatest width at middle of abdomen, which is appreciably broadened; head broader; pronotum with dark suffusion much as in male; tegmina coriaceous, opaque, with venation much less evident and hardly elevated, humeral trunk not contrastingly colored . . . . *fumigata* (Guérin).

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[1] Idem, pp. 199 to 205, Pl. VIII, figs. 6 and 7.

MALE: general colors above, ochraceous and black; head relatively broader and less trigonal; pronotum more transverse elliptical in outline, proportionately larger, with a typical blaberine central black lyrate marking; tegmina more membranous and less coriaceous, blaberine in character. FEMALE: general form elliptical in outline, with greatest width near base of abdomen, which is not particularly broadened; head narrow and more cordiform; pronotum with maculation blaberine in character; tegmina less opaque and coriaceous, with more evident venation, humeral trunk strongly and contrastingly blackish. *cabreræ*, new species.

Byrsotria fumigata (Guérin)

Plate XXIV, Figure 3

Blatta (*Blabera*) *fumigata* GUÉRIN, 1857, in La Sagra, 'Hist. Phys. Polit. et Nat. de' l'Île de Cuba, Anim. Artic.,' p. 335, tab. 12, figs. 4 and 4*a*. ♂; Environs of Havana, Cuba.

Blatta (*Monachoda*) *thunbergii* GUÉRIN, 1857, idem., p. 337, tab. 12, figs. 6 and 6*a*. ♂, ♀; Cuba.

[*Byrsotria thunbergi*] var. *minor* SAUSSURE AND ZEHNTNER, 1894, 'Biol. Cent.-Amer., Orth.,' I, p. 120. ♀; (by inference) Cuba.

CUBA.—Santiago de las Vegas, Havana Province, IV, 1905, (George Dimmock), 1 ♀, [U. S. N. M.]. Baracoa, Oriente Province, II, 5 (immat.), XI, 1915, 1 ♀, 2 immature individuals, [Davis Cln.]. La Patana, Baracoa, Oriente Province, 1 ♂, 1 ♀, 1 immature individual, [Davis Cln.]. Cueva de las Cucarachas, La Pantana, Baracoa, Oriente Province, 1 ♂, 2 ♀, 18 immature individuals, [Davis Cln.]. San Lucas, Baracoa, Oriente Province, 1 ♀, [Davis Cln.].

It has been our privilege to examine the original types of Guérin's species, now contained in the Scudder Collection at the Museum of Comparative Zoölogy. These specimens have been very badly damaged in the past by insect pests, parts of all of them being missing. However, the identity of the names may be clearly established, and the correctness of Rehn's association of *fumigata* and *thunbergii* as variants of a single species[1] is fully demonstrated. The unique male type of *fumigata* has the body almost completely destroyed and is minus head, pronotum and all limbs except the sinistral median and caudal ones, the tegmina and wings, however, being intact. It is labelled, "Blabera fumigata Guer. (type) ♂. Cuba." The male type of *thunbergii* is more nearly perfect than the other types, and while badly riddled by pests it lacks only the head, supra-anal plate, dextral cephalic and sinistral median and caudal limbs. The label reads, "Monachoda thunbergii Guer. Voy. da Sagra, (type) Cuba." The female specimen of *thunbergii* is now merely several fragments, i. e., several thoracic tergites with the dextral tegmen and the pronotal shell. The label is, "Monachoda thunbergii Guer. ♀. Cuba."

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[1] 1903, Trans. Amer. Entom. Soc., XXIX, p. 289; 1909, Second Rep. Centr. Experim. Station Rep. Cuba, pp. 190–191.

The species *thunbergii*, from the type and other evidence, was clearly based on the relatively uncommon fully macropterous condition of the male sex. We have given below measurements of the Guérin specimens as full as their condition warrants.

We have little to add to the comments already made by Rehn, except in the way of variational and distributional information.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Cuba, type of *fumigata*	....	...	....	34[1]	12.2[2] mm.
♂, Cuba, male type of *thunbergii*	35	10.2	14.8	23	12.8
♂, Cabaña, Havana	34	9.5	13.4	25.5	11.9
♂, Cabaña, Havana	34.5	9.3	13.3	21	12
♂, La Patana, Baracoa, Oriente	48	12.9	19	28.2	15
♀, Cabaña, Havana	36.6	12.1	19	9.5	12.2
♀, Santiago de las Vegas, Havana Prov.	43.2	15.1	23.5	11.5	15.2
♀, San Lucas, Baracoa, Oriente	49	15.5	26	13.4	17
♀, Cueva de las Cucarachas, La Patana, Baracoa, Oriente	42	13	21	11.8	13.4
♀, Cueva de las Cucarachas, La Patana, Baracoa, Oriente	42.5	13.5	21	12	13.8
♀, Baracoa, Oriente	54.5	14.2	24	13.8	16.9
♀, La Salud, Havana Prov.	55.5	16.7	26.2	14	18.2

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[1] From basal articulation, pronotum being missing, to estimated apex, as immediate apex is damaged.

[2] Actual width slightly greater as tegmen is somewhat curled.

The female sex shows a great amount of variation in general size, as the measurements we have presented below will attest. It was on the minimum sized type of the female that Saussure and Zehntner placed the varietal name of *minor*, which, however, is entirely unnecessary, as it is not sharply cut off in any way from the average or maximum sized individuals. The variation in tegminal length in males is very great, and this was the reason for the original separation of *fumigata* and *thunbergii*. We have now before us no perfect male individual having the tegmina as elongate as in the type of *fumigata*, but in 1903 Rehn[1] examined a male from Guanajay, Pinar del Rio Province, which agreed fully with the figure of the type in this respect. The other males here studied all have the tegmina failing to reach the abdominal apex by about two-thirds of the pronotal length.

It is evident from the above measurements of the female sex that individual size variation is not correlated with any particular section of the island, although environmental conditions may be to some extent controlling factors.

In coloration there is little noteworthy variation, except that the ochraceous section of the pronotum varies in width, the dark section being almost restricted to the pronotal disk in some females, and in others the ochraceous is narrowed to a marginal belt, which very greatly resembles the type of marking seen in *Hemiblabera tenebricosa*. The large series of immature specimens from Cueva de las Cucarachas represents both sexes and at least four instars.

The species is apparently distributed over the entire island of Cuba, as records are available from localities extending from Guanajay in Pinar del Rio to Baracoa, Oriente, which is very close to the eastern end of the island. The previous records were from Guanajay, Pinar del Rio (Rehn); Havana (Guérin), Cabana, Havana and La Salud, Havana Province (Rehn); Cardenas, Matanzas Province (Gundlach); Cabo Cruz (Gundlach), Gibara (Gundlach) and Guantanamo (Bolivar) in Oriente Province.

The only information we have on the habits of the species are those quoted by Rehn[2] from the observations of the junior author, made at Cabana, Havana, in January 1904; "I found the specimens under flat stones, sometimes in colonies of three or four mature specimens and numbers of immature individuals in all stages of development. The males were very scarce and moved more quickly than the others. When the sheltering stone was turned over, the colony would squat closely to the earth, but when one was seized the rest would make violent efforts to gain safety in the surrounding grass. With heads buried in the grass these insects seemed to feel perfectly safe, no matter how much of their backs remained exposed."

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[1] *Vide supra.*
[2] 1909, Second Rep. Centr. Experim. Station Rep. Cuba, p. 191.

It is evident, from the data given above, that the species is also a cave inhabitant. Probably any sufficiently commodious nook or crevice is utilized for the temporary protection of the individual, while the larger cavities may serve a more permanent and important use in the survival of the species.

Gundlach stated that the species has a very disagreeable odor.

Byrsotria cabreræ, new species

Plate XXIV, Figures 1 and 2

The present species is one which shows at first glance its distinctness from *B. fumigata*, the more truly blaberine general coloration and the transversely scalariform light and dark dorsal abdominal pattern in both sexes being very evident features of difference. The main differential features have been given above.

Type.—Male; Gibara, Oriente Province, Cuba. (José Cabrera; sea coast woods.) [Academy of Natural Sciences of Philadelphia, Type No. 5386.]

Size moderately large; form depressed, elliptical in outline.

Head completely hidden under pronotum, in outline with greatest width across eyes but slightly less than greatest depth, cordiform; occipital interspace between eyes subequal to supra-ocellar depth of eye and faintly less than inter-ocellar space; face subdeplanate.

Pronotum transverse elliptical, point of greatest width mesad, greatest length contained one and one-half times in greatest width: cephalo-lateral margins subangulately arcuate; caudal margin regularly and broadly arcuate; surface with lyrate figure weakly elevated, relatively smooth and sparsely punctulate, pale cephalic and lateral sections of pronotum finely rugulose and sparsely shagreenous.

Tegmina translucent, with venation pronounced and elevated; apex reaching distal margin of seventh abdominal tergite, broad, rectangulato-ovate, greatest width at distal third and contained nearly twice in greatest length of same: costal margin arcuate, slightly flattened, distad rather decidedly oblique arcuato-truncate to the broad, truncato-arcuate apex; sutural margin distad sharply arcuate to the apical margin: marginal and scapular fields broad; anal field occupying slightly more than one-half of tegminal length: venation regular, anal vein regularly arcuate, axillary veins at least seven in number. Wings when in repose reaching nearly to tegminal apices, apex broad, truncato-arcuate; venation normal, evident, ulnar vein with four rami.

Supra-anal plate transverse subrectangulate, distal margin biarcuate, rounding laterad to the proximal sections of the lateral margins, which are subparallel. Cerci subequal to the supra-anal plate in length, depressed, spatulato-styliform, apex rather blunted. Subgenital plate slightly asymmetrical, very similar to that of *B. fumigata.*

Allotype.—Female: Gibara, Oriente Province, Cuba. December, 1922. (José Cabrera; sea coast woods.) [Academy of Natural Sciences of Philadelphia.]

Differing from the description of the male in the following features.

Head faintly narrower than in male; occipital interspace between eyes slightly greater than supra-ocellar depth of eye.

Pronotum of the type usual in the genus, greatest length contained about one and two-thirds times in greatest width, which is caudad: cephalo-lateral margins regularly arcuate; caudal margin subtruncate, laterad very faintly produced toward the rectangulate caudo-lateral angles; surface as in male but general contour more cucullate.

Tegmina of the abbreviate and subquadrate form usual in this sex of the genus, with apex reaching to third abdominal tergite, leaving most proximal two exposed mesad, greatest width very slightly more than greatest length: costal margin moderately arcuate; sutural margin arcuate; distal margin oblique, bisinuate, apex costad and narrowly rounded: anal vein complete, arcuate, reaching sutural margin very shortly proximad of disto-sutural angle. Wings mere rudiments.

Supra-anal plate much as in male but biarcuations not as complete, more flattened, and proximal sections of the lateral margins more diverging and less parallel. Cerci distinctly shorter than supra-anal plate, robust, much blunted.

General color ochraceous-buff, overlaid with a pattern of pitch brown (chiefly on abdomen of male and ventral surface of same in female) to pitch black. Head pitch black except ventral half of clypeus, which is zinc orange; eyes snuff brown to bister; antennæ pitch black proximad, passing to russet (female) or ochraceous-tawny (male). Pronotum with lyrate pattern pitch black, larger spiculations touched with pitch brown; transverse bar (♀) or cloud (♂) near and parallel to the caudal margin, pitch black; cingulate margin of cephalic and lateral sections dark russet, becoming pitch black caudad of the central pattern. Tegmina with major and supplementary venation pencilled in pitch brown, except in marginal and scapular fields where the veins are largely of the basic buff; humeral trunk solidly pitch black proximad; costal margin edged with dark russet. Abdomen with tergites of the dark base color, broadly margined laterad and distad with pale color, the contrast and the tones more decided in the abbreviate tegmined female than in the male. Supra-anal plate of female of similar pattern to the other tergites, of male pale with two narrow dark transverse lines. Cerci dark. Venter of abdomen chestnut mesad, darker laterad and distad. Limbs dull burnt sienna, overlaid along flexor and extensor surfaces of femora with pitch brown; tibiæ and tarsi largely pitch brown.

Measurements

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Gibara, Cuba, type.	35.5	10	15.5	24	13.2mm.
♀, Gibara, Cuba, allotype...............	43.5	13	21	14.2	14.3

In addition to the type and allotype we have before us two immature individuals, male and female, from the type locality, both taken January 3, 1923, in sea coast woods, by José Cabrera. These specimens represent different instars, the male in that immediately preceding maturity, the female probably in the third preceding maturity. In both specimens, when compared with equivalent material of *B. fumigata*, the proportionately greater size of the pronotum is evident, while the width of the head shows the differences described in the adults.

What the extent of the range of this species will prove to be remains to be determined. It is quite possible it is limited to eastern Cuba, but at present no warranted assumption may be ventured.

It gives the authors pleasure to dedicate this most interesting and distinctive species to its collector, Senor José Cabrera, of Cotorro, Havana Province, Cuba, one of the most diligent and observant students of Cuban zoology.

HEMIBLABERA Saussure

Originally described on the basis of four species,[1] i. e., *brunneri*, *manca*, *capucina* and *granulata* Saussure, Kirby indicated[2] *manca* (now equalling the older *brunneri*) as the genotype of the assemblage. The genus clearly occupies a position intermediate between *Byrsotria* and *Aspiduchus*, here described. The species *brunneri* has a distinct tendency toward *Byrsotria*, while conversely *H. pabulator* and *granulata* exhibit more of an approach toward *Aspiduchus*. The four West Indian species before us should, in our opinion, be arranged linearly as placed in the following treatment.

KEY TO WEST INDIAN SPECIES OF *Hemiblabera*

1. General base color fuscous to blackish fuscous; pronotum of general color or with a sharply defined or subobsolete continuous paler cephalic and lateral margin, and occasionally a chestnut disk spot. Tegmina solidly dark. Abdomen transversely barred, chestnut to garnet brown or maroon on blackish or solidly fuscous blackish..2.

General base color ochraceous-buff; disk only of pronotum fuscous. Tegmina with vicinity of humeral trunk blackish fuscous, discoidal field clouded with same, marginal field contrastingly pale. Abdomen buffy and fuscous, transversely barred or median section of dark bars lacking. (Size medium.) [Bahamas.] *pabulator*, new species.

2. Size medium. Pronotum less transverse, greatest length contained one and one-half times in greatest width of same; caudo-lateral angles hardly pro-

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[1] 1893, Soc. Entom., VIII, p. 68.
[2] 1904, 'Synom. Catal. Orth.,' I, p. 166.

duced caudad. Tegmina of female with distal margin distinctly oblique; sutural margin of same one-half to three-fifths as long as costal margin. . . . 3.

Size large. Pronotum more transverse, greatest length contained one and two-thirds times in greatest width of same; caudo-lateral angles appreciably produced caudad. Tegmina of female with distal margin less oblique, this transversely arcuato-truncate in male; sutural margin of same subequal to or four-fifths as long as costal margin. Pale pronotal margin narrow, not at all or very obscurely reaching to caudo-lateral angles. [Hispaniola.]
tenebricosa, new species.

3. Coloration dull, nearly uniform, chiefly fuscous; paler lateral marginal section of pronotum obscure: surface, particularly of pronotum and tegmina, shagreenous. Tegmina in both sexes distinctly trigonal, not attingent; sutural margin not more than one-half as long as costal margin. [Antigua.]
granulata Saussure.

Coloration ranging from brilliant and contrasted with abdominal barring relatively conspicuous, to a general blackish fuscous, with abdominal barring virtually obsolete; yellow lateral and cephalic border of pronotum decided: surface faintly (♂) or weakly (♀) subshagreenous, moderately (♂) or weakly (♀) polished. Tegmina in male subquadrate, attingent; sutural margin at least three-fifths as long as costal margin: in female trigonal, hardly attingent; sutural margin not more than half as long as costal margin; distal margin oblique subsigmoid. [Porto Rico.]. . . . . *brunneri* (Saussure).

Hemiblabera brunneri (Saussure)

Blabera brunneri Saussure, 1869, Rev. et Mag. de Zool., (2) XXI, p. 113. ♀; Brazil.

Blabera brunneri Saussure, 1870, Miss. Scientif. Mexiq., Rech. Zool., VI, p. 117. ♀; Antilles?

H[*emiblabera*] *manca* Saussure, 1893, Soc. Entom., VIII, p. 68. ♂; Porto Rico.

Hemiblabera brunneri Saussure and Zehntner, 1894, 'Biol. Cent.-Amer., Orth.,' I, p. 122. Porto Rico.

Hemiblabera manca Saussure and Zehntner, 1894, idem, p. 122, Pl. v, fig. 20. ♂; Porto Rico.

Porto Rico.—Fajardo, Dept. of Humacao, II, 1899, (A. Busck), 2 ♂, [A. N. S. P. and Hebard Cln.]. Boqueron, Dept. of Humacao, V, 22, 1923, (from Porto Rico Dept. of Agr.; under bark of a tamarind tree), 1 ♀, [A. N. S. P.].

Culebra Island.—II, 1899, (A. Busck), 1 ♀, [U. S. N. M.].

A careful study of the descriptions and an examination of the material before us demonstrates that *brunneri* and *manca* were based on opposite sexes of the same species. For some reason Saussure failed to realize this when he described *manca*, although Brunner years before[1] had fully described both sexes, but unfortunately did not name the species. Rehn[2] also recognized the sexes as belonging to the same species, although he used *manca* for the insect. This was due to the influence of an earlier erroneous determination of *brunneri*, the material so referred representing *H. pabulator*, described below.

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[1] 1865, 'Nouv. Syst. Blatt.,' p. 383.

[2] 1910, Bull. Amer. Mus. Nat. Hist., XXVIII, p. 76.

Brunner first recorded this species on the basis of a pair from Porto Rico,[1] but failed to give it a name. The name *brunneri* was based on material erroneously reported from Brazil, which record one year later (1870), in the 'Mission Scientifique,' Saussure queried as Antillean. The following year (1872) Saussure[2] definitely recorded the species as from "Les Antilles; St.-Vincent; Porto Rico."

All subsequent information was based on specimens from Porto Rico, Culebra and St. Thomas (Shelford), except for Rehn's record from Nassau, Bahamas,[3] which we now know relates to a species here described as new (*pabulator*). Thus it would seem the species is limited in distribution to Porto Rico, and possibly solely the eastern part of the island, the adjacent members of the Virgin Islands and probably through the Lesser Antilles as far as St. Vincent, although the fact that no recent work on St. Vincent or nearby islands has brought the species to light, would seem to raise some doubt as to the correctness of the record from that island.

It is evident that considerable variation may exist in the general coloration and in the presence of a pronotal and a dorsal abdominal pattern. The Boqueron female is nearly uniform blackish fuscous above and below, with but subobsolete indications of proximal rufescent bars on the abdominal segments and no trace of a median pronotal pattern, although the yellow bordering marking of the lateral and cephalic periphery of the pronotum is as strongly indicated as in the more usual rufescent phase. In the blackish female, however the yellow pronotal marking does not extend mesad along the caudal margin, even to the slight extent it does in the rufescent condition. The head and limbs in the dark female are solidly of the same color as the remainder of the body, except that the coxæ and femora show intimations of a dull rufescent wash. The frequent absence of the reddish median maculation on the pronotum, described by most authors as one of the specific features, has already been noted by Rehn,[1] who found it absent in two of three Culebra specimens.

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[1] 1865, 'Nouv. Syst. Blatt.,' p. 383.
[2] 'Mél. Orth.,' II, fasc. 4, p. 145.
[3] 1903, Trans. Amer. Entom. Soc., XXIX, p. 290.

The difference in the tegminal shape in the two sexes has been described by both Brunner and Rehn.[1]

The four specimens before us measure as follows.

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Greatest Length of Tegmen	Greatest Width of Tegmen
♂, Fajardo, Porto Rico, [A. N. S. P.].........	24.2	8	12.1	7.1	7.2mm.
♂, Fajardo, Porto Rico, [Heb. Cln.]..........	26.7	8.4	13.2	7.8	8
♀, Boqueron, Porto Rico, [A. N. S. P.]....	33.2	10.5	16	8	8.7
♀, Culebra Island, [U. S. N. M.].............	35.5	11.8	18.3	9.5	10.5

Hemiblabera tenebricosa,[2] new species

Plate XIX, Figures 9 to 11

A close relative of the Porto Rican *H. brunneri*, from which it differs chiefly in the larger size, more transverse pronotum, which has its caudolateral angles more produced caudad, in the less oblique distal margin of the tegmina, and in consequence the nearly rectangulate disto-costal angle of the same, in the more limited and narrower yellow border of the pronotum, and in the lateral portions of the pronotum being more closely shagreenous.

Type.—Male; Fortaleza San Luis, Santiago [de los Caballeros], Province of Santiago, Dominican Republic, Hispaniola. April 7, 1919. (H. B. Sherman.) [Academy of Natural Sciences of Philadelphia, Type No. 5386.]

Size moderately large; form ovoid, moderately depressed; surface of dorsum weakly shagreenous, due to a covering of fine tooth-like points of variable density.

Head completely hidden under pronotum, cordiform in outline; interspace between eyes distinctly less than that between ocellar spots, equal to one and one-half times the greatest depth of eye, occipital border of eye arcuate; antennæ with third joint two-thirds as long as first joint.

Pronotum large, transverse, semicircular, greatest length contained one and two-thirds times in greatest width of same: lateral margins regularly arcuate, joining cephalad by a narrowly rounded section; caudo-lateral angles rectangulate, appreciably but not markedly produced or "hooked" caudad; caudal margin truncate mesad, weakly concave laterad, which somewhat accentuates the production of the lateral angles; all margins cingulate, the peripheral ones more strongly so and appreciably but weakly reflexed, margins in vicinity of lateral angles finely striatulate. In transverse section pronotum is distinctly bullate on disk, regularly concavo-declivent laterad, in longitudinal section with almost no indication of this cephalad. Surface of pronotum with a rather obscure lyriform pattern on disk, made up of a faintly elevated smoother area, with a pair of impressed, diverging arms, a median subcircular impression; remainder of surface appreciably finely shagreenous, particularly laterad, the spicules showing some faint tendency to form radiating lines caudo-laterad.

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[1] *Vide supra.*

[2] I. e., shrouded in darkness.

Tegmina quadrate, length and breadth subequal, reaching to third abdominal segment, attingent and narrowly overlapping: costal margin gently arcuate, disto-costal angle rounded rectangulate; sutural margin approximately as long as costal margin, moderately arcuate; distal margin nearly transverse, truncato-arcuate; disto-sutural angle rounded rectangulate; costal margin appreciably cingulate: humeral trunk well indicated, also other principal veins, and a radiating marginal field venation, no definite anal vein: marginal field in width equal to slightly more than two-fifths of entire tegmen: surface sparsely shagreenous. Wings rudimentary, hidden under tegmina.

Abdomen with dorsal surface sparsely shagreenous, ventral surface smooth. Tergites with caudo-lateral angles moderately acute produced. Supra-anal plate transverse subrectangulate, brief lateral margins rounding into the arcuato-truncate distal margin, which has a small but distinct rectangulate median excision. Cerci reaching to distal margin of supra-anal plate, broad depressed, acute styliform. Subgenital plate asymmetrical, regularly arcuate sinistrad and distad, broadly arcuato-emarginate dextrad; styles slender, dextral style at base of dextral emargination.

Limbs not particularly robust for body bulk. Caudal tarsi with metatarsus slightly shorter than length of other joints combined; pulvilli marked; arolia absent.

Allotype.—Female; Puerto Plata, Province of Puerto Plata, Dominican Republic, Hispaniola, July 5, 1915. (Norman L. Orme, Jr.) [American Museum of Natural History.]

Differs from the description of the type in the following features:

Size large. Head broader than in male. Interspace between eyes broad, slightly less than that between ocellar spots.

Pronotum in transverse section more decidedly bullate, lateral sections decidedly declivent.

Tegmina abbreviate, rectangulate, slightly transverse, greatest length slightly more than five-sixths of pronotal length, reaching to second abdominal segment, sutural margins overlapping briefly mesad: costal margin less arcuate, nearly straight; disto-costal angle broadly rounded rectangulate: sutural margin subequal to costal in length; distal margin weakly oblique, truncate; disto-sutural angle narrowly rounded rectangulate: marginal field equal in width to two-fifths of entire tegmen.

Supra-anal plate more strongly transverse than in male, distal margin more distinctly arcuate. Cerci shorter than supra-anal plate, ovate-lanceolate, very blunt. Subgenital plate ample, with appreciable subcercal emarginations, margin arcuate mesad.

General color pitch brown to pitch black, showing the rich translucence of pitch brown most evident in type. Pronotum with pale border of lateral cephalic sections relatively narrow, but varying in actual width, ochraceous-buff to ferruginous, widest immediately dorsad of each side of head, thence caudad narrowing and becoming obsolete well cephalad of or near the caudo-lateral angles or continuing of equal width to that angle, but subobsolete caudad of the middle of lateral margins. Abdomen solidly colored or with segments transversely barred proximad with burnt sienna to garnet brown or maroon. Head with median portion of face chestnut to bay, distinctly or little contrasted with dark remainder of head. Eyes hair brown. Antennæ of general color proximad, passing to auburn distad. Venter of abdomen colored much as dorsum, but paler. Limbs buckthorn brown to dresden brown proximad, passing to hay's russet to liver brown on tibiæ and tarsi.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Santiago de los Caballeros, Prov. Puerto Plata, Dominican Republic, type........	32.5	11.2	19.5	10.8	11.3mm.
♀, Puerto Plata, Dominican Republic, allotype.............	40	13.3	22	10.3	13.4
♀, Puerto Plata, Dominican Republic, paratype............	46.5	14.5	25.2	12	14.5
♀, Nassau, New Providence Island, Bahamas................	41.2	13.7	22.2	12.2	14.1

In addition to the type and allotype we have before us two adult females, one a paratype, from the same locality as the allotype, but taken May 8, 1915 by F. E. Watson, from the American Museum of Natural History; another from Nassau, New Providence Island, Bahamas, from the Brooklyn Institute; also an immature female in the instar preceding maturity, taken with the allotype. The additional adult specimens are both somewhat larger than the allotype, as the above measurements show. In addition the tegmina are slightly more obliquely, and in the case of the paratype more sigmoidly, arcuate distad than in the allotype. The pale pronotal border is less sharply defined in the paratype, becoming obsolete near the caudo-lateral angles, but throughout rather broader and duller than in the allotype. The Nassau specimen has the pale border much as in the type, but broader above sides of head. The latter specimen also has the abdomen almost uniform pitch black.

We felt considerable misgiving as to the correctness of the locality of the Nassau specimen. We referred the matter to Mr. Charles Schæffer, of the Brooklyn Institute, for advice, and he informs us there can be no question as to the correctness of the locality, the material having been taken by Mr. Engelhart while collecting material in the Bahamas, that no visit was then made to Hispaniola, and the material was carefully handled and labelled subsequently. It would seem, in consequence, that the species was accidentally introduced at Nassau from the Dominican Republic. The possibility of such introduction is far more likely than would at first be imagined, when it is realized that the principal steamship line from New York visiting Dominican ports calls each way at Nassau. The facts set forth by Mr. Schæffer have corroborative evidence in that *H. pabulator*, here described, known only from the Bahamas, was contained in the same accession lot as the specimen of *tenebricosa*.

The immature female is about three-fourths the bulk of the allotype, has the pronotal form quite distinctive when compared with the condition of *Blaberus*, and has its dorsal surface, particularly of the thoracic segments and the proximal abdominal segments, finely and closely shagreenous. The pale pronotal margin is distinctly but not completely indicated in this specimen.

Hemiblabera pabulator,[1] new species

Plate XIX, Figures 12 and 13

Hemiblabera brunneri Rehn, 1903, Trans. Amer. Entom. Soc., XXIX, p. 290. Nassau, New Providence, Bahamas. (Not *Blatta brunneri* of Saussure, 1869.)

Hemiblabera species Morse, 1905, Psyche, XII, p. 19. Mangrove Cay, Andros, Bahamas.

Very distinct from the other West Indian species of the genus, and one is referred to the generic comments above for its position in relation to the associated species, as well as its chief differential features. In coloration the present insect is very distinct from the others of the genus, being paler and lacking all rufescent tendencies, while the pronotal disk alone is dark, the tegmina also being basically pale. The tegmina approach those of *brunneri* more nearly in form than they do those of *tenebricosa*, but the pronotal form is more nearly that seen in *tenebricosa* than in *brunneri*.

Type.—Male; Mangrove Cay, Andros Island, Bahamas. 1904. (Owen Bryant.) [Hebard Collection, Type No. 843.]

Size medium (for subfamily): form elliptical, rather strongly depressed: surface moderately polished, but with that of pronotum sparsely and minutely shagreenous, of tegmina cribroso-punctulate, minutely shagreenous in the neighborhood of the humeral trunk; abdomen and venter smooth with occasional minute points.

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[1] I. e., a forager.

Head completely hidden under pronotum, cordiform in shape; interspace between eyes slightly less than that between ocellar spots, equal to one and one-half times the greatest depth of eye, occipital border of eye subtruncate; antennæ with third joint slightly less than half as long as proximal joint.

Pronotum relatively large, transverse, semicircular, greatest length contained one and three-fifths times in greatest (caudal) width of same; of form usual in genus, cephalic rounding of margins broader than in *H. tenebricosa;* caudo-lateral angles rectangulate; caudal margin truncate; all margins cingulate, the arcuate ones more distinctly so, margins in vicinity of caudo-lateral angles obscurely oblique striatulate. In section pronotum is deplanate arcuate, laterad faintly concave declivent, no indication of this cephalad. Surface of pronotum with lyrate area of disk, consisting of two closely placed reversed boot-shaped sections, weakly elevated or otherwise differentiated from general surface.

Tegmina subquadrate, greatest length and proximal width subequal, the former also subequal to the greatest length of the pronotum; apices reaching to base of third abdominal segment, sutural margins narrowly overlapping: costal margin weakly arcuate, more sharply curving to apex, which is disto-costal and well rounded; sutural margin two-thirds as long as costal margin, moderately arcuate, passing by an obtuse angle into the somewhat oblique, truncate distal margin: marginal field of tegmina broad, at its base equal to nearly two-fifths of total width of tegmen: humeral trunk well marked; discoidal field with about three principal oblique veins diverging from humeral trunk, no clearly indicated anal vein. Wings greatly reduced, hidden under tegmina.

Abdomen with tergites having caudo-lateral angles moderately acute produced. Supra-anal plate transverse, rounded rectangulate, supra-cercal section of margin regularly passing into the general arcuation of the distal section, a median obtuse-angulate emargination present; surface of plate with a shallow proximal transverse depression and a pair of larger depressions near the distal margin, a fine median carinula evident distad. Cerci reaching to distal margin of supra-anal plate, tapering, conical, apex acute. Subgenital plate moderately asymmetrical, sinistral and distal margins regularly arcuate, passing by a rounded rectangulation to the sharply rectangulate emarginate dextral side: styles very small, the sinistral placed near the sinistral base, the dextral at the base of the dextral excision: surface of plate from base of dextral style intermarginally about dextral excision of margin, canaliculate excavate.

Caudal tarsi with metatarsus very faintly shorter than length of other joints combined; pulvilli present; arolia absent.

Allotype.—Female; Nassau, New Providence Island, Bahamas. (S. H. Hamilton.) [Academy of Natural Sciences of Philadelphia.]

The features given below are those of difference from the description of the male sex above.

Size slightly greater than in male sex; surface with shagreenous character of pronotum and tegmina somewhat more marked.

Head with interspace between eyes equal to twice occipital depth of eye.

Tegmina as in male, but sutural margin faintly shorter and distal margin more strongly oblique, venation heavier and more numerous than in male, marginal field with intimations of irregular veins diverging from humeral trunk.

Supra-anal plate as in male in shape, but surface without transverse proximal depression. Cerci somewhat shorter than supra-anal plate, subdepressed, blunted. Subgenital plate of usual type.

General pale color light ochraceous-buff to ochraceous-buff, passing to buckthorn brown on the dorsum of the abdomen. Head with labrum and ventral portion of clypeus sharply mustard yellow to tawny; remainder of head russet to liver brown, with a vertical infra-ocular section, an interantennal bar and the dorsal section of the clypeus brownish black. Occasionally the head, except pale buccal region, is solidly brownish black (♂ paratype), again the ventral section of face is much deeper in color than the area dorsad of the dark transverse bar (immature ♀). Antennæ tawny paling to mustard yellow, or mars brown paling to tawny. Eyes russet to fuscous. Pronotum with disk fuscous, the shagreenous points of the surface surrounding the disk touched with the same; disk maculation limited to the paired structural area described above (type) or covering a semi-elliptical area of much greater size (paratypic male and allotype), the density of the maculation somewhat variable and occasionally showing faint ferruginous points, as well as a nearly complete pale median dividing line; entire margin of pronotum as well as costal margin of tegmina vinaceous-rufous. Tegmina with humeral trunk suffused with fuscous, the discoidal field with a wash of tawny to cinnamon-brown, paling toward the sutural and distal margins; marginal field rather sharply pale. Abdomen with the dark transverse bars proximad on the segments relatively solid (allotype) or broken into lateral groups (type and paratype), not involving lateral marginal region of segments; in the condition with reduced bars the lateral groups by reduction in density segregate into a large circular spot, two small dots and a short line. Supra-anal plate and cerci largely fuscous, in the type the former is basically the same color as the dorsum of the abdomen with radiating dark cloud lines. Venter with its base color correlated with that of dorsum; coxæ prout's brown (intensive) to weak cinnamon-brown (recessive), in the former case including the femora and passing to hazel or ochraceous-tawny distad on the femora and including the tibiæ and tarsi, or in the latter case with the limbs aside from coxæ mars yellow.

The type is in the recessive condition, the paratypic male and allotype are distinctly intensive in coloration.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Mangrove Cay, Andros Island, type..	32.5	10	16.2	10	9.8mm.
♂, Nassau, New Providence Island, paratype...............	25.7	9.2	15	8.6	9
♀, Nassau, New Providence Island, allotype	37.5	11	17.5	10.2	11

In addition to the type and allotype we have before us an adult male from Nassau, New Providence Island, Bahamas, the property of the Brooklyn Institute of Art and Sciences, which we consider a paratype, and an immature female in the Hebard Collection, bearing the same data as the type. The two males examined demonstrate that the species has an appreciable amount of variation in size in the same sex, although the extension (type) or retraction (paratype) of the abdomen has much to do with the apparent difference in the general length. Examination of the ventro-cephalic margin of the femora shows that on the cephalic femora this margin may be unarmed, or may have from one to three spines mesad while the median and caudal femora may be unarmed or have from one to two or three well-spaced spines. The immature specimen is probably in the second instar preceding maturity, has the surface shagreenous character quite decided and its coloration does not differ markedly from that of adults.

Hemiblabera granulata Saussure

H[emiblabera] granulata SAUSSURE, 1893, Societas Entomologica, VIII, p. 68. ♀; "Mexico."

Hemiblabera granulata SAUSSURE AND ZEHNTNER, 1894, 'Biol. Cent.-Amer., Orth.,' I, p. 122, Pl. V, fig. 21. ♀; "La Antigua in Vera Cruz, Mexico."

Caudell has recently reported this species from the island of Antigua, Lesser Antilles,[1] and through his kindness we have before us a pair of the species. We fully support his identification, and we would emphasize strongly the probability of the locality originally given for this species being erroneous in interpretation. We think it probable that the type was labelled "Antigua," that Saussure for some reason believed this was a locality in Mexico, and, in 1894, in endeavoring to find an "Antigua" in Mexico, could locate only "La Antigua, Vera Cruz." Whether this assumption is correct probably can never be determined, but the fact remains that the species, virtually beyond question, occurs only on the island of Antigua.

Caudell has erred in stating the male cannot be distinguished from the female by the number of sternites or ventral abdominal segments. The male before us shows seven evident ventral abdominal segments in addition to the subgenital plate. The distal of these segments is apparent in the male before us only laterad, but it is present, as well as six other clearly visible segments.

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[1] 1922, Univ. of Iowa Studies Nat. Hist., X, No. 1, pp. 26–29, fig. 2.

The species is more shagreenous and dully colored than any other of the genus, and represents a somewhat different stock from *pabulator*, but likewise shows marked tendencies toward *Aspiduchus*.

Aspiduchus,[1] new genus

This genus is apparently related on one hand to *Hemiblabera* Saussure, and on the other to *Monachoda* Burmeister. From both it differs in the extreme deplanation of the pronotum, which also is almost exactly semi-circular in outline, and in the reduced but rounded coriaceous tegmina in both sexes, which also possess evident anal sulci, and in the non-fossorial and distinctly cursorial type of development of the cephalic tibiæ. From *Hemiblabera* the present genus is also distinguishable by the more marked deplanation of the whole body, and by the relatively great width of the marginal field of the tegmina. From *Monachoda*, *Aspiduchus* also differs in the far more distant eyes, semi-circular pronotal form, which has its caudal margin truncate, and no cucullate pronotal tendency at all indicated, in the reduced tegmina and wings, in the acute angulate caudo-lateral angles of the abdominal tergites, and in the elongate metatarsi.

Generic Description.—Form deplanate; tegmina abbreviate; wings greatly reduced. Head hidden under pronotum, broad, deplanate, subcordiform; occipital interspace between eyes not less than one and one-half times occipital depth of eye; antennæ with proximal joint large. Pronotum semi-circular in outline, markedly deplanate, disk and supra-cephalic section but weakly indicated; caudal margin transversely sub-truncate; surface largely fine shagreenous. Tegmina covering nearly one-half of abdomen, arcuate distad; marginal field very broad; venation simple, anal sulcus indicated; surface coriaceo-shagreenous. Wings reduced, hidden under tegmina. Abdomen with caudo-lateral angles of tergites produced acute; supra-anal plate of both sexes ample, sub-bilobate; subgenital plate of male asymmetrical. Limbs slender, tibiæ all elongate and cursorial in type, spines long and slender. Metatarsi elongate; pulvilli large; arolia absent.

Genotype.—*Aspiduchus deplanatus* (*Blabera deplanata*) (Saussure).

The reference of the typical and unique species of this genus to *Archimandrita* by Saussure[2] was made without any adequate study of material, as, while some affinity exists, as shown above, violence was done evident relationships, manifest in the form and texture of the pronotum and tegmina and the general shape of the body.

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[1] From *άσπιδ ουχος*, buckler-bearer.
[2] 1893, Soc. Entom., VIII, p. 67.

Aspiduchus deplanatus (Saussure)

Plate XIX, Figure 14

B[labera] deplanata Saussure, 1864, Rev. et Mag. de Zool., (2) XVI, p. 348. Antilles.

Blabera deplanata Saussure, 1864, Mém. Hist. Nat. Mex., I, pt. 3, p. 250. ♀; Cuba.

Archimandrita deplanata Saussure and Zehntner, 1894, 'Biol. Cent.-Amer., Orth.,' I, p. 116, Pl. v, fig. 18. ♂, ♀; Cuba.

Porto Rico.—Corozal, Dept. of San Juan, I, 25, 1914, I, 18, 1915, (H. E. Crampton; in limestone cavern, by thousands in grass and walls), 6 ♂, 1 ♀, 11 immature ♂, 1 immature ♀.

While originally described from Cuba this striking and distinctive species has not been reported from that island, on the basis of new material, since the original description. Gundlach[1] first recorded it from Porto Rico, where he stated it occurred under stones and leaf litter, further commenting that he had not encountered it in Cuba. The latter remark he repeats in his Cuban "Contribucion."

Apparently the species is locally numerous in suitable situations, such as caves, rock crevices and the shelter of large stones.

The specimens before us fully agree with the descriptions and figure published by Saussure, and Saussure and Zehntner. The sexes show no differences in their general appearance, and the single adult female is not appreciably larger than the largest males. Whether the relative scarcity of females, both adult and immature, in our material represents a natural condition, or is due to collecting chance, we are unable to say. Saussure and Zehntner have mentioned in the 'Biologia' that the number of spines in the median group on the cephalic femora is variable, and this is fully supported by the material before us. The adult specimens before us show the following formulæ for these spines: 0–3, 2–0, 1–2, 2–3, 2–3, 2–4, 4–3. It is evident that presence or absence of these spines, aside from number when present, is of no specific value.

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Corozal, Porto Rico.	44.8	14.2	24.2	17.5	13.2 mm.
♂, Corozal, Porto Rico.	49.4	15.4	25	19.5	15.2
♀, Corozal, Porto Rico.	52.8	15.6	25	21	16

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[1] 1887, An. Soc. Españ. Hist. Nat., XVI, p. 144.

The form of the pronotum in the immature individuals shows clearly evident the relationship of this genus to *Hemiblabera*. The series of immature specimens represents four instars, the youngest with a body length of nineteen millimeters.

Corydiinæ

The Corydiinæ is a group of blattids of very diverse form, character, and habits, in many ways one of the most interesting assemblages in the family. In size there is a great amount of variation in the forms belonging to the subfamily, although the majority are quite small, and often symbiotic with termites, ants, bees and wasps. Of many of the species we know nothing concerning their habits. A number of the species possess marked sexual dimorphism. The body, and occasionally tegminal, surface in a number of genera is covered, to a considerable degree, with depressed chætiform hairs.

The region of greatest differentiation and probable center of distribution of the subfamily is tropical America, and particularly the Brazilian and Guianan section. But seven genera, of more than twenty, occur in the Old World, and of these two are circumtropical and four strictly African.

Key to West Indian Genera of the Corydiinæ

1. Distal joint of palpus elongate, acute lanceolate, not infundibuliform or trigonal in outline. Male with short, sub-quadrate tegmina. Wings rudimentary. Female unknown. (Limbs very slender and elongate. Distinct arolia present.) . . . . *Pholadoblatta*, new genus.

   Distal joint of palpus broad, infundibuliform or trigonal in outline. Male (unknown in *Simblerastes*) with fully developed tegmina and wings. Female fully winged (*Holocompsa* and *Latindia*) or apterous (*Simblerastes*.) . . . . 2.

2. Female apterous; form ovate, polyphagoid, dorsum as a whole heavily hirsute. Limbs short and very robust; tibiæ closely and heavily spined. No arolia or pulvilli present. (Male unknown.) . . . . *Simblerastes*, new genus.

   Male and female with fully developed tegmina and wings; form elliptical to elongate elliptical, dorsum as a whole not heavily hirsute, hairs covering either sparse or largely limited to pronotum . . . . 3.

3. Form ovate, not strongly deplanate. Tegmina obliquely and sharply divided into an opaque and a hyaline section. Limbs robust, relatively short; tibiæ heavily spined. Arolia present. Coloration contrasted, often in part with metallic sheen . . . . *Holocompsa* Burmeister.

   Form elongate elliptical, strongly deplanate. Tegmina not divided into an opaque and a hyaline section. Limbs slender, elongate; tibiæ very sparsely spined. Arolia absent. Coloration largely dull and uniform . . . . . *Latindia* Stål.

HOLOCOMPSA Burmeister

The genus *Holocompsa* is composed of a small number of species found in the tropics of both hemispheres, but more numerous in species in Central America than any other part of the world. The species are all small, secretive in habits and one at least has been extensively distributed by commerce. Some species are strikingly colored and others have a marked metallic sheen on portions of their tegmina, this being very pronounced in *H. metallica* described below.

KEY TO WEST INDIAN SPECIES

Form more robust. Female with pronotum yellow to orange-rufous, weakly suffused with dark brown at caudal margin. Lateral portions of pronotum not subvertical. Metallic green-blue sheen of opaque portion of tegmen weak in both sexes. Hyaline portion of tegmina of ♀ weakly brownish suffused, with broad clear transverse bar at middle of tegmina. Ventro-cephalic margin of cephalic femora distad with two spines. (Male with pronotum blackish.) [West Indies in general.]..*nitidula* (Fabricius).

Form more slender. Female with pronotum black. Lateral portions of pronotum subvertical. Metallic blue sheen of opaque portion of tegmen brilliant. Hyaline portion of tegmina of ♀ weakly brownish suffused, with narrow sharply evident clear transverse band at distal third of tegmina. Ventro-cephalic margin of cephalic femora distad with a single spine. (Male unknown.) [Hispaniola.] *metallica*, new species.

Holocompsa nitidula (Fabricius)

[*Blatta*] *nitidula* FABRICIUS, 1781, 'Spec. Ins.,' I, p. 345. ♀ (from description); Surinam.

DOMINICA.—Laudet, VI, 12, 1911, (F. E. Lutz; vicinity of house), 1 ♀.

This minute species shows considerable difference in coloration in the sexes, the chief one being that in the male the pronotum and opaque portion of the tegmina are uniform blackish, with a weak but appreciable metallic green-blue sheen, while the female has the pronotum largely orange, the blackish with metallic green-blue sheen limited to the same portion of the tegmina as in the male. Burmeister's *cyanea* was based on the male, his *collaris* on the female sex, both from St. Thomas, as Hebard has shown in his detailed treatment of the species.[1]

Numerous records of the species from the "Antilles," without specification of exact locality, appear in the literature, while it has been definitely recorded from the following islands: Cuba (as *collaris* by Guérin, Brunner, Bolivar and Gundlach; as *cyanea* by Saussure, Walker,

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[1] 1917, Mem. Amer. Entom. Soc., No. 2, pp. 206–208.

Bolivar and Gundlach); Havana, Cuba (Rehn as *cyanea*); Jamaica (as *Euthyrrapha nitidula* by Walker); Porto Rico (as *collaris* and *cyanea* by Gundlach); St. Thomas (as *cyanea* by Burmeister, Brunner and Walker; as *collaris* by Burmeister and Brunner); Dominica (above); St. Vincent (as *collaris* by Brunner).

Outside of the West Indies the species is known from Key West, Florida, Mexico, Surinam, Mauritius, Spanish Guinea, Cameroons, French Congo and Ivory Coast, western Africa. It is a domiciliary species and is probably widely distributed within the American tropics, from which it is spreading to parts of the warmer regions of the Old World. Probably a native of the West Indies its West African distribution may be explained by slave ship introduction, while its occurrence in Mauritius may have been due to an extension from a West African colony by slave ships headed to the Mascarenes, which received many African slaves. Gundlach states that in Cuba it is found in houses under boards, chests, etc. At Key West, Florida, the authors found the insect in folds of burlap bags under the counter of a fruit store, in company with *Supella supellectilium*, *Blattella germanica*, *Leurolestes pallidus* and *Periplaneta americana*, and with *Blaberus craniifer* between old boards in a wood shed.

Holocompsa metallica, new species

Plate XX, Figures 1 and 2

This is a strikingly beautiful insect related to *H. nitidula*, but with a far more brilliant metallic blue sheen on the opaque portions of the tegmina. This condition is in the female sex, while the parallel but far less intensive condition of *H. nitidula* is in the male sex alone. The general form is more slender than the same sex of *nitidula*, the lateral sections of the pronotum are more deflexed, the tegmina and wings surpass the apex of the abdomen by nearly the pronotal length, while a striking difference is that the ventro-cephalic margin of the cephalic femora possesses but a single spine distad, instead of two as in *H. nitidula*.

TYPE.—Female; Sanchez, Province of Samaná, Dominican Republic, Hispaniola. May 27, 1915. (F. E. Watson; along railroad through jungle and swamp west of town.) [American Museum of Natural History.]

Size very small; form as usual in genus but slender for female sex; surface moderately shining, pronotum and marginal field of tegmina with numerous hairs, some longer and more erect than the others, which are declivent, far less hirsute than *H. nitidula*.

Head almost completely hidden under pronotum when seen from dorsum.

Pronotum weakly transverse, disk moderately arcuate in transverse section, lateral section strongly deflexed and subvertical, regularly passing into disk, a narrow medio-longitudinal impression and paired subcircular shallowly impressed areas laterad on disk are present: cephalic margin moderately convex, passing by a rounded obtuse-angulation into the arcuato-truncate lateral margins; caudo-lateral angles narrowly rounded obtuse; caudal margin of disk shallowly convex: surface of lateral portions of pronotum appreciably impressed, particularly caudad, while the margin is distinctly cingulate, thus giving the impression of an intermarginal groove in this area.

Tegmina surpassing apex of abdomen by nearly length of pronotum, of the same general type found in *H. nitidula*, but line delimiting opaque proximal section more arcuate proximad. Wings reaching to tegminal apices.

Supra-anal plate weakly transverse, margin broadly and markedly convex. Subgenital plate with valvar emargination acute-angulate, valves faintly convex in profile. Cerci with six to seven joints.[1]

Cephalic femora with ventro-cephalic margin bearing but a single quite large spine distad.

Color of head, pronotum and venter black, the limbs pitch brown. Tegmina with opaque portions brilliant metallic antwerp blue; transparent portions of tegmina infumate with dresden brown except for a narrow transverse perfectly clear hyaline section at tip of opaque portion. Antennæ black.

Length of body, 4.2 mm.; length of pronotum, 1.34; greatest width of pronotum, 1.93; length of tegmen, 4.36; greatest width of tegmen, 1.84.

The type of this beautiful species is unique.

SIMBLERASTES,[2] new genus

This genus, of which unfortunately only the female sex is available, has much the same general appearance in that sex as the polyphagid genera *Arenivaga* and *Eremoblatta*, but the sum total of its features show more relationship with the Corydiinæ than with the Polyphaginæ. Our lack of knowledge of the male sex is most regrettable, as more conclusive evidence on the position and relationship of the genus would then be available. This additional information we hope will be secured in the near future.

Probably the nearest relatives of *Simblerastes* are *Holocompsa* and *Compsodes*, the present genus being one of those possessing a valvate subgenital plate in the female sex. However, this association is of a provisional nature, as it would be unwise in the absence of the male sex to do more than indicate a tentative position for the genus. The relationship with *Latindia* and *Melestora* can be determined only when more is known concerning *Simblerastes*. It is evident that no intimate relationship exists with the myrmecophilid genera *Attaphila* Wheeler, *Phorticolea*, *Nothoblatta* and *Atticola* Bolivar, as well as *Pholadoblatta* here described. The distinctness of *Simblerastes* from *Sphecophila* Shelford is apparently certain, although our material of the latter genus is hardly in comparable condition. *Sphecophila* has the cerci narrow and tapering, instead of broadly subspatulate styliform, the limbs are more slender, and the body lacks the markedly bristling vestiture of *Simblerastes*.

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[1] One cercus complete has six joints, the other with at least the distal clearly lacking has six present.

[2] From σιμβλος, a bee-hive or store, and ἐρ στης, a lover, in allusion to the association of the genotypic species with termites' nests.

Generic Description.—Male sex unknown. Female sex ovoid, apterous, surface closely covered with short, depressed, regularly spaced, chætiform hairs; peripheral margins of thoracic segments, with erect, longer, chætiform hairs. Head short and broad, nearly circular in outline; eyes lateral; interantennal portion of face weakly bullate; palpi robust, ultimate joint short, very broadly infundibuliform; antennæ short, blunt, nineteen to twenty joints, proximal and third joint subequal in length, second very short. Pronotum transversely sub-trapezoidal, subcucullate, caudal margin weakly convex; surface not impressed. Mesonotum with caudal margin faintly concave; metanotum with margin distinctly concave. Abdomen broad, margins of segments transverse (proximad) to markedly concave (distad). Supra-anal plate transverse, margin regularly arcuate with faint median emargination. Cerci very short, broad fusiform. Subgenital plate transverse, large, with meso-distal section markedly valvate. Limbs short and robust. Femora with ventral margins sparsely but distinctly spinulose; cephalic femora with ventro-cephalic margin bearing several proximal long spines followed by a series of very brief spinules and distad a very heavy long curved spine; genicular spine of median and caudal femora very heavy. Tibiæ subdepressed, broad; spination very heavy, of cephalic tibiæ fossorial in character, of extensor surface triseriate in disposition. Caudal metatarsus one and one-third times as long as remainder of tarsal joints, venter of same biseriately spinulose. Pulvilli and arolia absent. Tarsal claws asymmetrical, margins unspecialized

Genotype.—*S. jamaicanus*, new species.

Simblerastes jamaicanus, new species

Plate XX, Figures 3 to 5

Type.—Female; Liguanea Plain near Kingston, Jamaica. July 5, 1920. (Hebard and Rehn; in débris under large pieces of abandoned termites' nest on ground.) [Hebard Collection, Type No. 859.]

Size small; form depressed.

Head completely concealed under pronotum when seen from dorsum; inflation of face distinct but not pronounced, extending from interocellar region to clypeal suture; ocelli indicated only by minute pale spots on internal side of scrobal depression. Palpi with antepenultimate joint robust, surpassing penultimate joint and nearly equal to ultimate joint; penultimate joint moderately infundibuliform, robust and short; ultimate joint with distal margin obliquely truncate.

Pronotum with cephalic margin short, arcuate; latero-cephalic angles broadly rounded-obtuse; lateral margins weakly arcuate; latero-caudal angles subrectangulate; greatest width at caudal fifth, greatest length contained one and one-half times in greatest width of same; strongly convex in transverse section.

Abdomen very broad, faintly broader even than metanotum; peripheral margins of segments, supra-anal plate and cerci with chætiform hairs of the shorter type. Cerci about half as long as supra-anal plate. Subgenital plate with margin bounding valvate section proximad concave; valves subdepressed, hirsute.

Caudal tibiæ with metatarsus about one and one-fourth times as long as remaining tarsal joints.

General color of dorsal surface dresden brown to tawny in adults, in immature individuals occasionally as pale as ochraceous-buff, the depressed, short, chætiform hairs giving a golden sheen. Venter of same tone as dorsum except that of the abdomen is darker, nearer cinnamon-brown, of the pale immatures hardly darker. Eyes blackish brown. Tibial spines little darker than general color.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Greatest Width of Abdomen
♀, Liguanea Plain, Jamaica, type..	4.78	1.59	2.52	3.44 mm.
♀, Liguanea Plain, Jamaica, paratype........................	4.62	1.42	2.35	3.27

In addition to the type we have before us seventeen adult female paratypes and forty-nine immature females bearing the same data as the type, also a single adult female taken from under a stone at night on the outskirts of Kingston, July 4, 1920, by Hebard. The adults are quite uniform in character, as well as in coloration. The immature series represents at least three instars preceding maturity, and it is noteworthy that no immature males are included. Of the adults three, one being the type, carried oöthecæ. That of the type is 2.01 millimeters long, by 1.42 deep; all are of a dull white color and superficially resemble seeds or grains of sand. The carina is sharply and finely marked, while the sides of the oötheca are irregularly impressed.

This interesting little cockroach occurred in numbers in fragmentary débris of a large abandoned termites' nest on the ground in the dry Liguanea Plain, a few miles northwest of Kingston. A park-like cover of mimosaceous trees is present over much of this plain and under these the ground is largely bare. The specimen taken on the outskirts of Kingston was secured at night by the aid of a flash-lamp, hiding under a stone in a field of short grass. To what extent the species is dependent upon the protection of termite or other structures remains to be determined, also the character and habits of the male sex.

LATINDIA Stål

Latindia castanea Brunner

L[atindia] castanea BRUNNER, 1893, Proc. Zöol. Soc. London, p. 604. ♀; Balthazar, Grenada, West Indies.

We have no material from the area studied which is referable to the genus *Latindia*. We, however, have made a comparison of Brunner's very brief and insufficient description of *castanea* with material of the rather widely distributed *L. dohrniana*, including one female from Trinidad,[1] and we feel that subsequent work will show the two are identical.[2] If the two names are found to be based upon the same species, *castanea* has some months priority and would have to be used in place of *dohrniana*.[3]

Latindia dohrniana is distributed from southern Vera Cruz, Mexico, south to Panama, east to Trinidad.

PHOLADOBLATTA,[4] new genus

Related to *Myrmecoblatta* Mann[5] and *Phorticolea*[6] and *Atticola*[7] Bolivar. *Myrmecoblatta* and *Atticola* are supplied with tegmina, like the present genus, while *Phorticolea* is apterous, but it shows, however, much similarity to *Pholadoblatta*. From *Myrmecoblatta* the present genus differs in the pronotum of the male lacking the strong lateral "gutters", the pronotum in section being arcuate and without the Perisphærid-like form found in *Myrmecoblatta;* in the abdomen being relatively narrow, instead of broad and depressed; in the shorter eyes and broader head; in the less robust antennæ; in the less marked difference in proportions of the ultimate and penultimate maxillary palpal segments; in the asymmetrical and divided subgenital plate of the male; and in the elongate limbs, which have the tarsi with distinct arolia and appreciable pulvilli. From *Phorticolea* the new genus can be separated by the male possessing quite well developed tegmina, in the limbs apparently being more slender, and in the character of the male subgenital plate, which is entire and with two regular styles in *Phorticolea*. From *Atticola* Bolivar, known solely from the female sex, *Pholadoblatta* apparently differs in the shape of the head, which is elongate subtriangular in *Atticola;* in the non-fimbriate pronotum, which in transverse section shows no reflexions laterad, as occur in *Atticola* (and also in *Myrmecoblatta*); in the tegmina being relatively large and covering basal half of abdomen (♂), instead of trigonal and lobiform as in *Atticola* (♀); as well as in less evident features of limb difference. Probably male sexual features of *Pholadoblatta* will be found to differentiate it further from *Atticola*, when that sex of the latter genus is known.

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[1] This specimen, received from Prof. Lawrence Bruner, was recorded by him as *castanea* (1906, Journ. N. Y. Entom. Soc., XIV, p. 143), which is independent confirmatory support of the suggestion regarding the identity of *castanea* and *dohrniana*.

[2] Hebard (1921, Proc. Acad. Nat. Sci., Phila., p. 215, footnote 29) already has suggested the synonymy of *castanea* and *dohrniana*.

[3] *Latindia dohrniana* Saussure and Zehntner, 1894, 'Biol. Cent.-Amer., Orth.,' I, p. 111, Pl. v, fig. 7, ♀; Guatemala.

[4] From φωλάς, lurking in a hole, in allusion to the habitat of the genotypic species.

[5] 1914, Psyche, XXI, p. 172. Genotype (by original designation): *M. rehni* Mann. We have before us two paratypic individuals of *M. rehni*, and the type, a paratype and other authentic material of *M. wheeleri* Hebard.

[6] 1905, Mitth. Schw. Entom. Gesell., XI, p. 138. Genotype (by monotypy): *P. testacea* Bolivar

[7] Idem, p. 140. Genotype (by monotypy): *A. mortoni* Bolivar.

The relationship of this genus to *Nothoblatta* Bolivar and *Attaphila* Wheeler, other minute myrmecophilous blattids, is not sufficiently close to require detailed comment. *Nothoblatta*, in the male, possesses elongate tegmina, reaching beyond the apex of the abdomen, and perfectly developed wings, the caudal margin of the pronotum is broadly rounded and the male subgenital plate is undivided; *Attaphila* has a very robust build, a marked villose covering, and very different limb specialization. Of these genera the first is, by inference, considered an ectobiid by Bolivar, and *Attaphila* is now given a position in the Corydiinæ, where we feel all of these aberrant myrmecophilous blattid genera probably belong. In the present condition of our knowledge of them the assignment must be considered as purely provisional, but this action is warranted by the indicative character of the external features of these insects. Their specialization is so highly developed that some of the supposedly more important characters of the group are masked or modified, but others, though more subtle, remain undisturbed.

GENERIC CHARACTERS.—Size minute; form elongate elliptical; surface of pronotum and tegmina with sparse covering of short pile. Head regularly convex on face and laterad, broad ovoid in outline, greatest depth nearly equal to greatest width; ocelli and ocellar areas sub-obsolete; eyes well developed, reaching slightly ventrad of level of ventral margins of antennal scrobes; palpi with ultimate and penultimate joints compressed, ultimate joint acute lanceolate in lateral outline; antennæ heavy, filiform, proximal joint obconic, joints distad of third moniliform, those proximad very short and transverse, increasing in length distad. Pronotum nearly semicircular in outline, lateral and cephalic margins nearly regularly arcuate, caudal margin weakly arcuate emarginate, latero-caudal angles rounded rectangulate; in transverse section the pronotum is strongly arcuate. Tegmina corneous, reaching to, or slightly distad of, middle of abdomen, each tegmen subquadrate to subrectangulate, disto-costal angle broadly rounded, no apparent venation but usual position of humeral trunk indicated. Wings rudimentary, reaching to base of abdomen and completely hidden under the tegmina. Abdominal tergites of male unmodified. Ventral surface of abdomen with exposed lateral triangular accessory plates projecting caudad at caudo-lateral section of the sternites.[1] Subgenital plate of male asymmetrical, fissate, with a marked sinistral style and a rudimentary dextral one. Limbs elongate, particularly caudal pair; tarsi elongate, with pulvilli and arolia. Cephalic femora having ventral margins with series of closely placed hairs, that of cephalic margin pectinate in the closeness and regularity of the hairs; caudal femora with a brief series of short spines distad on each ventral margin; caudal tibiæ with margins briefly spined, those on extensor surface arranged triseriately; caudal tarsi with metatarsus slightly longer than remaining joints combined, ventral surface of metatarsus, and a lesser degree of remainder of tarsus, multispinulose.

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[1] These resemble very greatly similar structures illustrated by Adelung as occurring in the African "*Blatta*" *lobiventris*, 1905, Annuaire Mus. Zool. Acad. Impér. Sci. St. Pétersb., IX, p. 423, Fig. 1a.

Genotype.—*Pholadoblatta inusitata* (Rehn).

As to the proper position of this remarkable genus in a linear arrangement of the Corydiinæ, little can be given, at this time, additional to that indicated above in the diagnostic comparison of the genus. Its points of difference from the related genera, known from the male sex, are such that it is probably more nearly related to *Phorticolea* than to *Myrmecoblatta*, but its affinity with *Atticola* is certainly close, even though the male of the latter genus is unknown. The pronotal form of the latter, however, shows an approach toward that of *Myrmecoblatta*, from which *Atticola*, on the other hand, is at once distinguished by possessing arolia and lobiform tegmina, the latter in the female sex. The ambisexual value of these characters however, remains, to be determined.

Pholadoblatta inusitata (Rehn)

Plate XX, Figures 6 to 8

Aphlebia inusitata Rehn, 1906, Bull. Amer. Mus. Nat. Hist., XXII, p. 113. ♂; Andros Island, Bahamas.

Cuba.—Camoa, Havana Province, (José Cabrera), 1 ♂, [A. N. S. P.].

We also have before us the male type of this species, taken in May to June, 1904, by Dr. Wm. M. Wheeler, from "the galleries of a large nest of a jumping ant (*Odontomachus hæmatodes insularis* Guérin var. *pallens* Wheeler)."[1]

Examined anew in the light of present day knowledge of the family it seems desirable to present some critical information concerning this most interesting ant-guest blattid, additional or supplementary to that in the original description. These features have been taken from the type.

Head with interspace between eyes at occiput nearly twice width of interspace between antennal scrobes: occipital outline, from facial aspect, broadly but regularly arcuate: eyes little projecting, individual facies sharply marked.

Pronotum with greatest length contained one and one-third times in greatest width, moderately cucullate over head, which is completely covered when seen from dorsum; lateral sections appreciably declivent, particularly cephalo-laterad; all margins narrowly cingulate.

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[1] Wheeler in Rehn, *vide supra.*

Tegmina relatively broad for truncate tegmina in a species of the general proportions of the present, the costal sections projecting laterad of the pronotum and the thorax and base of abdomen; greatest width contained one and three-fifths times in greatest length of tegmen, subquadrate; disto-costal angle very broadly rounded, costal margin passing broadly into the distal one; disto-sutural angle much more narrowly rounded; costal field appreciably recurved dorsad in a broad but shallow gutter-like concavity.

Supra-anal plate very short, broad, margin subarcuate, the plate almost hidden under preceding tergite;[1] latter transverse, with its distal margin sinuato-emarginate at cercal bases and with a slight median emargination, caudo-lateral angles appreciably produced, rectangulate. Cerci broad fusiform, tapering distad, nearly twice length of penultimate tergite. Subgenital plate asymmetrical, axis directed slightly dextrad, obliquely fissate disto-mesad, but the divided portions closely overlapping; median section of plate with a produced rectangulate projection sinistrad of median fissure; a marked and fully developed style inserted at dextral base of plate; dextrad margin of plate is obtusely arcuate; in section plate is weakly rostrate mesad.

Length of body, 4.37 mm.; length of pronotum, 1.43; greatest width of pronotum, 2.1; length of tegmen, 2.1; greatest width of tegmen, 1.3; greatest width of abdomen, 1.9; length of caudal tibia, 1.47; length of caudal tarsus, 1.5.

The Camoa, Cuba, individual differs from the type in the following noteworthy features:

Tegmina more ovoid rectangulate, appreciably longer than in type, reaching to base of antepenultimate tergite, greatest width contained about one and three-fourths times in greatest length of tegmen; both distal angles broadly rounded, distal margin thus almost evenly arcuate, although the disto-costal angle is more extensively rounded than the disto-sutural.

Subgenital plate with divided portions not overlapping, as in type.

Length of body, 4.11 mm.; length of pronotum, 1.42; greatest width of pronotum 1.84; length of tegmen, 2.18; greatest width of tegmen, 1.26; greatest width of abdomen, 1.68.

This genus and species is the only blattid which is presumably a myrmecophile, known from the West Indies. Other genera associating with ants, and known or presumed to be dependent upon their associates, are found in the American tropics and subtropics, in central Texas, Mexico, southeastern Brazil, Uruguay and Argentina. When our knowledge of these minute forms of secretive habits is much more complete, the apparent geographic isolation of *Pholadoblatta* doubtless will appear less remarkable.

Oxyhaloinæ

The subfamily Oxyhaloinæ is made up of three major assemblages of genera, which future study may show have less in common than generally supposed. Representatives of all three of these groups occur in the West Indies. The groups center about the genera *Oxyhaloa*, *Chorisoneura* and

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[1] This is called the "supra-anal plate" in the original description.

Plectoptera, the latter two assemblages of small or very small forms, while the group containing *Oxyhaloa* is chiefly made up of average-sized species. All three have peculiarities in the folding of the wings, the extreme condition of complexity in the folding and storing of these very ample appendages being found in *Plectoptera*. Certain of the members of this group bear a great resemblance to coccinellid beetles, and the genus *Chorisoneura* also shows a most bewildering array of specific combinations of general form and coloration details. All three groups are found in both hemispheres, although in America the *Oxyhaloa* assemblage is represented by but one species (*Oxyhaloa buprestoides*), which occurs in Cuba, Mexico and Central America, and is quite probably an accidental introduction. The position of Brunner's genus *Anaptycta* is very uncertain (see p. 298), and it is, for that reason, not included in the following key.

Key to West Indian Genera of Oxyhaloinæ

1. Form deplanate. Tegmina with marked venation. Wing with or without a pronounced intercalated triangle in the wing, but no reflexed appendicular field..2.

   Form convex dorsad, coleopteroid. Tegmina with venation weakly indicated, never elevated. Wing with greatly developed and, in repose, reflexed appendicular field. (Size very small.)................*Plectoptera* Saussure.

2. Texture of tegmina entirely coriaceous (except normally covered portion of dextral tegmina.) Wing with no intercalated triangle. Ulnar vein of wing with a regularly pectinate series of short rami, evenly distributed to apex of wing. (Size medium.)..................................*Oxyhaloa* Brunner.

   Texture of tegmina never coriaceous, frequently with marginal and scapular fields translucent. Wing with intercalated triangle very ample, sharply marked off from remainder of wing. Ulnar vein of wing without regularly pectinate series of rami. (Size small.).............*Chorisoneura* Brunner.

Oxyhaloa buprestoides (Saussure)

Bl[atta] buprestoides Saussure, 1862, Rev. et Mag. de Zool., (2) XIV, p. 166. ♂; Cuba.

O[xyhaloa] murrayi Brunner, 1865, 'Nouv. Syst. Blatt.,' p. 253, Pl. vi, fig. 25. ♀; Old Calabar (West Africa).

Nauphœta aspersata Kirby, 1900, Ann. and Mag. Nat. Hist., (7) V, p. 285. Sex?; Pretoria, Transvaal.

Cuba.—Baracoa, Oriente Province, IV, 1915, 3 ♀, [Davis Cln.]. Jauco, Oriente Province, IV, 1915, 2 ♀, [Davis Cln.].

For sixty years this species has been known from Cuba, to which island it was supposed for many years to be peculiar, but its real relationship to the Old World members of the genus had never been established.

No other species of this dominantly African genus has been reported from America. The probable reason the true relationship of *buprestoides* to the African forms of the genus has never been determined, appears to be that no cohesive or coordinated work has been done on the genus since 1865, and at that date Brunner was unacquainted with *buprestoides*, except for its original description. There can be little question but that *buprestoides* is another slave ship introduction from West Africa, and in Cuba it appears to be limited to the eastern portion of the island, and in fact to Oriente Province. The only previous exact records from Cuba are Bayamo, Baracoa and Yateras (Gundlach), and sixty miles west of Santiago (Rehn). Saussure and Zehntner have reported the species from Mexico and Guatemala, which possibly represent direct African introductions, or more probably an expansion of the Cuban colony, through the port of Santiago.

In explanation of the synonymy given above, we have carefully compared Cuban material with individuals of both sexes from Bitje, Ja River, Cameroons, in the collection of the Academy, and females from Koedoes River, Transvaal, in the same collection. The former series is clearly representation of *murrayi* Brunner, the latter is equally so of *aspersata* Kirby. No appreciable difference which could have any specific importance is evident, and there seems no alternative but to unite the three names. Of these *buprestoides* is the oldest, and we have the peculiar situation of a name based, undoubtedly, on a relatively recent colonization of the species, having priority over others based on the species as occurring in its native land.

What relationship *buprestoides* has to the Abyssinian *O. ferreti* Reiche and Fairmaire remains to be determined, as no comparable material is available, but *ferreti* is apparently distinct, judging from the original information. The latter name is some years older than *buprestoides*.

This species has been well described and figured by Saussure,[1] while the wing structure also has been illustrated by the same author.[2] Distant[3] has given a good colored figure of the species.

CHORISONEURA Brunner

In South America this genus is represented by a very considerable number of species, differing in form, tegminal texture and color, as well as size, although all are small. In Central America we find a small number of forms, while in the United States but a single one is found in the Southern States. In the West Indies but two definitely known species occur, both of which are here described, although a record of a questionable determination may add another. From the relationships exhibited by the two species it would appear logical to believe they reached the West Indies by different routes, i. e., the Barbadian one from South America, the Jamaican form from Central America.

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[1] 1864, Mém. Hist. Nat. Mex., III, p. 116, Pl. I, fig. 20.
[2] 1870, Miss. Scient. Mex., Rec. Zool., VI, p. 90, Pl. II, fig. 48.
[3] 1900, 'Insecta Transvaal.,' I, Pl. I, fig. 8.

As we feel very certain the West Indian records of *Chorisoneura mysteca* are erroneous determinations, and probably relate to *C. barbadensis*, here described, we are omitting *mysteca* from the following key.

Face solidly blackish brown. Interocular region solidly cream-colored, non-lineate transversely. Pronotum with a median discal pair of arcuate opaque light ochraceous-buff lines, in addition to bars of similar coloring along the cephalic and caudal margins of the pronotum; pronotal disk with base color darker laterad than mesad. Distal portion of tegmina more sharply attenuate and acute, this portion of costal margin more straight convergent to apex. White pencilling of tegminal veins more complete and pronounced, more contrasted with base color, all of axillary veins pencilled. (Barbados.)........... *barbadensis*, new species.

Face ochraceous, cream-colored laterad. Interocular region transversely quadrilineate, alternating dark lines and cream-colored lines. Pronotum without paired pale lines within disk, but vicinity of cephalic and of caudal margins with pale transverse bars; pronotal disk with base color not darker laterad than mesad. Distal portion of tegmina less sharply attenuate, although still acute, this portion of costal margin weakly but very appreciably arcuate to apex. White pencilling of tegminal veins less complete and pronounced, not as contrasted with base color, those axillary veins nearest to anal sulcus alone pencilled. (Jamaica.) *formosella*, new species.

Chorisoneura barbadensis, new species[1]

Plate XX, Figures 9 to 11

Chorisoneura mysteca Rehn, 1905, Entom. News, XVI, p. 175. (Not *Blatta mysteca* Saussure, 1862.) Barbados.

Originally considered by Rehn to be *mysteca* Saussure, this insect is now seen to be very different, and in general appearance far more nearly related to *C. formosella*, described below, *panamæ*,[2] *gemmicula*,[3] *specilliger*[4] and *guianæ*[5] Hebard, and *albonervosa*,[6] Rehn, with typical material of all of which it has been compared. The Panamanian *panamæ* and the Guianan *guianæ* represent a different species group from *barbadensis* and its closer relatives. These two species have in common a tessellate pattern of the discoidal and anal fields of the tegmina, instead of a longitudinal clear hyaline lining, as well as a type of face and occiput coloration not seen in the other group. Comparison with *C. formosella* from Jamaica is made in succeeding pages under that species. *Barbadensis*, *formosella*, the Panamanian *gemmicula* and *specilliger*, and the Brazilian *albonervosa* have in common the veins of the discoidal and anal fields of the tegmina lined with whitish, and the face black with occiput cream-colored, or if face is not black the occiput has two narrow transverse cream-colored lines (*formosella* and *specilliger*). The present species differs from *specilliger* in having the face black, the disk of the pronotum with two median, comma-shaped whitish markings, and the styles of the male subgenital plate shorter and stockier: from *gemmicula* in the occiput lacking a narrow transverse blackish line on the cream-colored base, in the shape of the paired median white markings of the pronotal disk, and in the styles of the male subgenital plate being of a different shape: from *albonervosa* in the face and most of occiput not solidly black, in the more numerous discoidal sectors and anal veins, which also are clear hyaline narrowly margining the veins, while the styles of the males are very similar in structure.

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[1] There exists a possibility that this species may be a near relative of Brunner's very poorly described *Anaptycta bipunctulata* (*vide infra*), in which case *Anaptycta* would become a synonym of *Chorisoneura*.

[2] 1920, Mem. Amer. Entom. Soc., No. 4, pp. 125, 127, Pl. vi, figs. 9 and 10. ♂, ♀; Porto Bello (type loc.) and Rio Trinidad, Panama.

[3] 1920, Idem, pp. 126, 138, Pl. vi, figs. 20 to 22. ♂, ♀; Cabima (type loc.), Alhajuela, Porto Bello and Rio Trinidad, Panama.

[4] 1920, Idem, pp. 126, 135, Pl. vi, figs. 16 to 19. ♂, ♀; Gatun (type loc.), Paraiso, Porto Bello, Rio Trinidad and Juan Mina, Panama.

[5] 1921, Proc. Acad. Nat. Sci., Phila., p. 217, Pl. xiv, figs. 11 and 12. ♂, ♀; Bartica, British Guiana (type loc.); Cayenne, French Guiana.

[6] 1916, Trans. Amer. Entom. Soc., XLII, p. 255, Pl. xiv, figs. 21 and 22. ♂; Pará, Brazil.

TYPE.—Male; Barbados, West Indies. October, 1902. (Miss Field.) [Academy of Natural Sciences of Philadelphia, Type No. 5382.]

Size relatively small (for genus); form appreciably deplanate; surface shining.

Head visible cephalad of pronotum for its entire width; in shape broad cordiform, greatest width subequal to greatest depth, ventral section of head sharply narrowing from eyes to buccal region; occipital outline transverse truncate, interspace between eyes broad, equal to one and one-quarter times occipital depth of eye; face weakly convex. Palpi slender; antepenultimate joint slender, elongate, subequal; penultimate joint moderately infundibuliform, two-thirds as long as antepenultimate joint; ultimate joint faintly longer than penultimate and slightly shorter than antepenultimate joint; deepest at base, tapering distad. Eyes prominent. Antennæ incomplete.

Pronotum of the type found in the related species, greatest length contained nearly twice in greatest width; cephalic margin weakly convex; lateral margins broadly and strongly arcuate; caudal margin truncato-arcuate.

Tegmina elongate, acute lanceolate, surpassing apex of abdomen by nearly greatest width of pronotum; greatest width of tegmen, at proximal third, contained slightly more than three times in greatest length of same; costal margin strongly arcuate proximad, nearly straight thence to the acuminate apex, which is very narrowly rounded; sutural margin moderately arcuate distad, strongly arcuate proximad, straight for a considerable mesal section; marginal field broad, well continued distad; scapular field at broadest point equal in width to one-half that of tegmen; anal field elongate pyriform, in length equal to one-third that of entire tegmen; venation decided; costal veins of tegmina fifteen in number, proximal ones well arcuate, distal ones nearly straight oblique; discoidal sectors moderately oblique, several bifurcate; anal sulcus strongly arcuate proximad, straight oblique thence to its junction with sutural margin; axillary veins five in number. Wings with intercalated field relatively large (for the genus), reaching one-fifth of the wing length toward the base; medio-discoidal area slightly broader than widest section of medio-ulnar area, former regularly broken into subquadrate areolets by transverse nervures; costal veins elongate sub-clavate at their distal extremities; ulnar vein furcate distad.

Abdomen with supra-anal plate transverse, broadly and obtusely produced mesad, distal extremity rather broadly truncate. Cerci elongate, depressed, ensiform, quite broad at proximal third, acuminate distad, joints sharply defined. Subgenital plate small, somewhat unsymmetrical, sinistral side with margin proximad of styles more arcuately lamellate than on dextral side, between styles margin of plate is produced into a short, recurved, claw-like structure; styles in shallow sockets, large, subequal, closely placed, nearly symmetrical in form, bulbous proximad and tapering sharply to narrow apices (Plate XX, fig. 11), which are depressed in a plane transversely oblique to that of the style itself, internal margin of styles nearly straight, external margin of styles strongly sigmoid, internal section of ventral surface longitudinally concave.

Femora with ventral margins virtually unspined, some of the hairs, however, chætiform in their development; disto-ventral spine on cephalic faces of all femora large, particularly so on cephalic femora; genicular spine of median and cephalic femora large, recurved. Arolia large; tarsal claws unequal; fourth joint of tarsus alone with pulvillus.

General color zinc orange, paling toward ochraceous-salmon on venter. Head with base of occiput buckthorn brown, a broad transverse bar of pale ochraceous-buff between eyes, extending as a narrow line about meso-ventral section of eyes; face blackish brown; antennal scrobes pale ochraceous-buff; eyes mummy brown. Pronotum with broad lateral sections clear hyaline; disk with paired elongate reniform areas of russet, separated by a median area of zinc orange; cephalic margin heavily and caudal margin more narrowly opaque pale ochraceous-buff. Tegmina with discoidal field and all of scapular field except narrow section adjacent to discoidal vein clear hyaline; all venation except anal sulcus pencilled clear hyaline on ground of general color. Wings washed with pale cinnamon-buff; distal section of mediastine vein and a continuation for some distance distad across median section of costal veins, bister. Abdominal sternites narrowly edged with opaque pale ochraceous-buff, the distal section of the sternites with a considerable area of the same tone; pleura with areas of opaque pale ochraceous-buff. Limbs light ochraceous-buff.

Length of body, 7 mm.; length of pronotum, 2; greatest width of pronotum, 2.9; length of tegmen, 7.9; greatest width of tegmen, 2.5.

The type of this beautiful species is unique.

Chorisoneura formosella, new species

Plate XXIV, Figures 7 and 8

Closely related to *C. translucida* (Saussure) from Mexico and Central America, also *barbadensis*, described above, *gemmicula* and *specilliger* Hebard, from Panama, and *albonervosa* Rehn, from Amazonian Brazil.

From *translucida* the nearest relative of *formosella*, the chief characters of distinction of the latter are the much finer character of the dark line separating the creamy white lines of the occipital region, the straighter and less arcuate proximal half of the discoidal and median veins of the tegmina, the less numerous albolineate axillary veins of the tegmina and the more attenuate cerci. From *gemmicula* the lack of black on the face in *formosella*, the more numerous albolineate axillary veins of the tegmina and the more elongate and attenuate cerci are differential characters, while from *barbadensis* the present insect most strikingly differs in the pronounced transverse light and dark lineations of the occiput, in the pale face, in the more uniformly ochraceous circular disk spot of the pronotum and in the blunter tegmina, which have the base tone less markedly bicolored and the white pencilling of the veins more delicate and less complete. From the Brazilian *albonervosa*, *formosella* is chiefly separable by the absence of black from the occiput and face, the different character of the transverse interocular occipital bars, the pale instead of blackish antennæ, the more regularly arcuate costal margin of the tegmina, which latter also have the apices more sharply acute, and in the more complicated tegminal venation.

From *specilliger*, of Panama, the present species can at once be separated by the more decided interocular dark bars, pale antennæ, less regularly elliptical pronotum, less numerous tegminal rami and less complicated white lineate tegminal pattern.

Hebard's *gatunæ*, from Panama, has some resemblance to *formosella*, but the latter differs from the former, and agrees with all of the species with which it has been compared above, in the more circular pronotal disk and the broader marginal field of the tegmina.

The fact that the Jamaican insect is more closely related to the mainland *C. translucida* than it is to the Lesser Antillean *C. barbadensis* is faunistically significant.

TYPE.—Male; between Pleasant Hill and St. Helens Gap, Blue Mountains, Jamaica. Elevation, 4400 feet. July 24, 1923. (Rehn; swept from huckleberry trees (*Vaccinium meridionale*).) [Academy of Natural Sciences of Philadelphia, Type No. 5422.]

Size medium (for genus); form as in related species; surface highly polished.

Head markedly deplanate, broadly visible cephalad of the pronotum when seen from dorsum, seen in facial aspect the greatest depth of head is about five-sixths greatest width across eyes; occipital interspace between eyes slightly more than twice as great as occipital depth of eye. Palpi moderately elongate; penultimate joint about three-fourths as long as antepenultimate joint, infundibuliform; ultimate joint subequal in length to antepenultimate joint, relatively shallow.

Pronotum transversely elliptical, greatest width faintly greater than one and one-half times pronotal length; cephalic margin broadly arcuate, arcuation faintly more pronounced in an area equal in width to that of occiput between eyes, regularly passing laterad into the broadly arcuate lateral margins, which pass caudad by rounded yet evident caudo-lateral angles into the very weakly arcuate caudal margin; point of greatest width virtually at middle; disk area circular in form: surface appreciably deplanate, weakly and broadly declivent laterad; surface of disk with a median shallow but evident and roughly reversed horseshoe-shaped depression.

Tegmina acute lanceolate, greatest width, which is slightly proximad of middle, contained three and two-fifths times in greatest tegminal length: costal margin well arcuate proximad, in distal section much less arcuate and regularly approaching the acute but very narrowly rounded apex; sutural margin largely straight, briefly arcuate proximad, weakly indented at anal sulcus and distad curving to apex: marginal field broad, equal in width to one-half of anal field, extending distad slightly beyond apex of anal field; scapular field broad, at widest point nearly equal to half of tegmen; anal field relatively short, acute sub-pyriform: costal rami of all character eleven; axillary veins five in number; anal vein meeting sutural margin at acute angle. Wings fully developed.[1]

Cerci fusiform, greatest width at proximal fourth, regularly tapering in distal half, apparently composed of nine segments, these well marked and clearly indicated in moniliform fashion except proximad, in extent distad slightly surpassing apex of subgenital plate. Supra-anal plate transverse, trigonal produced meso-distad, apex distinctly but not greatly V-emarginate mesad. Subgenital plate large; moderately produced meso-distad, apex distinctly V-emarginate for slightly more than a fourth of length of plate.

Limbs as described for *C. barbadensis.*

General color of occiput, disk of pronotum and dorsal surface of abdomen and general tone of wings as seen through tegmina ochraceous-orange; lateral portions of pronotum and marginal field of tegmina nearly clear hyaline. Pronotum with narrower transverse section cephalad and broader similar bar along caudal margin opaque light ochraceous-buff; disk of pronotum with a pair of darker (nearer tawny) clouds cephalad, which may become (type) confluent caudad. Tegmina with anal, discoidal and section of scapular fields near humeral trunk washed with clay color, costal section of scapular field clear hyaline, passing without sharp division into infumate section; humeral trunk, proximal section of each of costal veins, discoidal sectors and two outer axillary veins finely pencilled to a greater (paratype) or lesser (type) degree with whitish; portion of costal veins in clear hyaline section of scapular field and discoidal sectors in normally covered portion of right tegmen and inner axillary veins, not pencilled. Interocular space with a dorsal transverse bar ranging from ochraceous-orange (paratype) to dark chestnut-brown (type), followed ventrad by an equally broad transverse bar of cream-color (paratype) to ochraceous-buff (type), then another narrower bar of chestnut-brown and finally another pale bar similar in tone and width to the more dorsal pale one; face pale ochraceous-orange mesad, passing to cream-color laterad; palpi and antennæ light ochraceous-buff; eyes dresden brown (paratype) to mummy brown (type). Venter of thorax and limbs cinnamon-buff (paratype) to clay color (type); ventre of abdomen light ochraceous-buff, with large discal spot on subgenital plate reaching to and involving much of caudal margin, cinnamon-brown. Cerci pale.

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[1] As but two specimens of this species are known we have refrained from spreading either one, on account of the possibility of damage. As most excellent differential characters are elsewhere fully evident, the hazard does not seem warranted at this time, and the description of the wing structure may well await the acquisition of additional material.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♀, type	7.5	1.8	2.8	8.5	2.5mm.
♀, paratype	8	1.7	2.5	7.2	2.2

In addition to the type we have before us a single paratypic female, taken near Bog River, Portland Parish, Jamaica, April 18, at night, by A. E. Wight, and from the collection of the Museum of Comparative Zoölogy.

The type bears an oötheca, which is carried with the sparsely crenulate ridge dorsad, the border, which is ventral, resting in the emargination of the subgenital plate. The exserted portion of the oötheca is three millimeters long.

It is evident from the material before us that the species exhibits considerable variation in general size, as shown by the measurements given above, and also to a certain degree in the depth of the coloration,

The type was taken while sweeping sprigs of huckleberry tree branches nearly ten feet from the ground, in a heavy patch of relatively dry leeward slope type forest.[1] Numerous efforts were made that day and subsequently to secure in that and similar spots additional material of the species, and particularly a male, but without success.

Chorisoneura mysteca Saussure

Bl[atta] mysteca SAUSSURE, 1862, Rev. et Mag. de Zool., (2) XIV, p. 167. Sex?; "Mexico calida."

This Central American species was recorded from Grenada by Brunner[2] and from Barbados by Rehn (*vide supra*). The latter reference we now know to be incorrect, the species being here described as *C. barbadensis*. Whether the Grenadan insect is the same as the Barbadian one remains to be determined, and we have no alternative, without material, but to permit the record to remain under *mysteca*, from which we feel quite certain Brunner's specimen is distinct.

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[1] See Shreve, 1914, Publ. No. 199, Carneg. Inst. of Wash., pp. 33–35.
[2] 1893, Proc. Zoöl. Soc., London, p. 601, Mirabeau Estate, Grenada.

Anaptycta bipunctulata Brunner

A[naptycta] bipunctulata Brunner, 1892, Proc. Zoöl. Soc., London, p. 202, Pl. xv, figs. 1*a*-1*b*. Sex?; St. Vincent, British West Indies.

This genus and species is very briefly described and atrociously figured by Brunner, and its real affinity is uncertain. We have seen no material from the area studied which would be referable to *Anaptycta*, and we are very dubious of its generic distinctness from *Chorisoneura*. Brunner states that the genus is related to *Anaplecta* (*vide* Ectobiinæ), but differs in the ulnar vein of the tegmina emitting pectinate rami toward the posterior (sutural) margin and in the femora being unarmed beneath. The latter character would remove *Anaptycta* from the proximity of *Anaplecta*. and associate this type of blattid more nearly with *Chorisoneura*. Oblique rami of the ulnar vein of the tegmina are found in *Lissoblatta* Hebard, an ectobiine relative of *Anaplecta*, and also in *Chorisoneura*, but in neither case is this pectination of the orthodox and conventionalized type figured by Brunner. Whether his figure is correct or exaggerated remains to be determined; the description is certainly too brief and unconvincing for trustworthy deduction without material.

Brunner states that of the three specimens seen by him, two were beaten from branches, at an elevation of 1000 feet, in the forest above Châteaubelais, in September. The third specimen possessed no exact data.

PLECTOPTERA Saussure

This genus of strikingly formed and colored, though relatively minute, cockroaches is peculiar to the American tropics, and we have reason to feel that a very large part of its evolutionary development has taken place in the West Indies. Quite a few species are known from Central America, but the diversity of specific features there found is not as great as in the West Indian forms.

All the members of the genus possess very strikingly developed wings; the very large appendicular field, which has a longitudinal fold as well as being reflexed in its entirety, is exceeded in proportionate size in no other genus of Blattidæ.

The species of the genus *Plectoptera* all are foliage and flower frequenters, generally secured by beating low arborescent vegetation, or are attracted to light.

Females of the species are relatively difficult to determine, as the chief specific differential features are in the shape of the male subgenital plate and the styles. In the majority of the species these are fixed in character and show little variation, but in *P. porcellana* we find, as is frequently the case, a species far more plastic in this respect than is true of the other related forms. The separation of the species is quite difficult and the features are subtle, so that reference to the accompanying figures must be made to understand clearly the species here discussed.

Color features are of considerable importance in this genus, but chiefly in the assembling of the species into groups. The segregational types of coloration we have provisionally recognized appear to be as useful in the grouping of the Central American forms. However, it must be realized that the essential diagnostic specific features are in the male genitalia, although the color lines apparently represent phylogenetic stocks. As the character of complicated genitalic features is not readily expressed in words, we have contented ourselves with a group key to the forms, which verbally is not as complete as we would prefer, but we have given references, to our figures, which will greatly assist in specific recognition.

A. Group with a mosaic-like densely punctate pattern of tegmina, occasionally becoming somewhat irregularly minute vermiculate (*pygmæa*); anal field of tegmina frequently dark fuscous and solidly colored. Pronotal disk frequently (generally in *porcellana*) solidly fuscous.

Porcellana Group
- *porcellana* Saussure (Cuba)
  (Pl. XXI, figs. 1–4; XXII, figs. 4–6; XXIII, figs. 1–3.)
- *dorsalis* (Burmeister) (Porto Rico)
  (Pl. XXI, fig. 5: XXII, figs. 7, 13–14; XXIII, figs. 4–5.)
- *pygmæa* (Beauvois) (Hispaniola and Jamaica)
  (Pl. XXI, figs. 6–7; XXII, fig. 8; XXIII, fig. 6.)

B. Group with tegmina having a delicate and very fine pale lineolate pattern of principal and axillary veins, with pale vermiculate punctulations between veins; anal field of tegmina not solidly dark fuscous. Pronotal disk not solidly infuscate.

Rhabdota Group
- *rhabdota*, new species (Porto Rico)
  (Pl. XXI, figs. 8–9; XXII, fig. 9; XXIII, fig. 7.)
- *perscita*, new species (Dominica)
  (Pl. XXII, figs. 1, 10; XXIII, fig. 8.)

C. Group with a mosaic punctate pattern of tegmina, not as dense nor as delicate as in group A, occasionally subobsolete (probably due to method of preservation); anal field of tegmina never solidly dark fuscous. Pronotal disk not infuscate.

Vermiculata Group
vermiculata, new species (Cuba)
(Pl. XXII, figs. 2, 11; XXIII, fig. 9.)
lacerna, new species (Cuba)
(Pl. XXII, figs. 3, 12; XXIII, fig. 10.)

D. Group with non-punctulate or non-lineate, uniformly pale tegmina. Pronotal disk never solidly dark fuscous.

Poeyi Group
poeyi (Saussure) (Florida, Cuba)
infulata, new species (Porto Rico)
(Pl. XXIII, fig. 11.)
dominicæ, new species (Dominica)
(Pl. XXIII, figs. 12–13.)

The color types of groups A and B, would not seem very distinct from the features given above, but a comparison of representatives of the two show a real, though subtle, difference in character of the punctulations. The pattern of group B is a distinctive one, clearly recognizable when once grasped. Group A shows a considerable range in intensification and recession of the pattern, the latter having the dense and finely punctulate mosaic pattern uniform, except for wavy pale cloudings and principal vein linings, while the intensive has the anal field solidly dark fuscous. Group D is composed of forms greenish yellow in tone.

Hebard[1] has given a concise presentation of the generic characters of *Plectoptera*.

Plectoptera porcellana (Saussure)

Plates XXI, Figures 1 to 4; XXII, Figures 4 to 6; XXIII, Figures 1 to 3

Bl[atta] porcellana Saussure, 1862, Rev. et Mag. de Zool., (2) XIV, p. 164. Sex?; Cuba.

Plectoptera krugi Saussure and Zehntner, 1893, 'Biol. Cent.-Amer., Orth.,' I, p. 85. ♂, ♀; Cuba.

Cuba.—Cotorro, Havana Province, III, 3, 1921, (José Cabrera), 2 ♂, 1 ♀, [A. N. S. P.]. Cayamas, Oriente Province, III, 3, 11, 12, V, 24 and 28, XII, 19 and 24, (E. A. Schwarz), 4 ♂, 7 ♀, [U. S. N. M. and A. N. S. P.]: (Baker), 1 ♀, [A. N. S. P.]. Cristo, Oriente Province, X, 3, 1913, (F. E. Lutz), 1 ♀.

The synonymy of *Plectoptera krugi* is perfectly evident when a series of *porcellana* is examined. The type of coloration described as *krugi* is represented in the series before us, and passes regularly into the more usual phase of *porcellana* with the anal field of the tegmina solidly and contrastingly infuscate. The very subtle yellowish punctulato-lineations stressed in the description of *krugi* are particularly evident in recessively colored specimens, and care should be taken that this type of coloration is not confused with that of the Porto Rican *P. rhabdota*, which is clearly and decidedly multilineate, as well as having other differential features.

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[1] 1917, Mem. Amer. Entom. Soc., No. 2, pp. 250–257.

We are provisionally considering Bolivar's *Plectoptera micans*,[1] described from material from the Cienaga de Zapata, Santa Clara Province, Cuba, to be based on the present species. The examination of authentic or topotypic material of *micans* may show our association to be incorrect, but at the present time no other course is open. No form of the genus but *porcellana* would at all answer the description of *micans*, but in a few features of the latter description we find discordance with our material. These, however, are probably due to the difficulty of exact description of the type of coloration of the tegmina found in *porcellana*. Bolivar, unfortunately, said nothing about the male genitalic features, if indeed he had that sex before him.

Aside from the locality of *micans* and the Cotorro record given above, the previously known exact records (Bayamo, Cayamas and Cristo) of *porcellana* are from Oriente Province in eastern Cuba.

The species has been recorded from Porto Rico by Gundlach[2] and from Mayaguez in the same island, by Rehn.[3] The first reference in every probability refers to *dorsalis*, the only other Porto Rican species with the same type of variegated color pattern. The Mayaguez record refers to *rhabdota*, as the original material, now before us, demonstrates.

Gundlach states he took this species at Bayamo upon flowers, while *micans* he secured on the flowers of "Júcaro" in May. The available records indicate the presence of the species adult in February, March, May, October and December.

Rehn[4] has supplied some useful notes on the color phases of this beautiful species. The punctulato-lineolate type which formed the basis of *krugi* Saussure and Zehntner is near the extreme recessive phase of the species, although in the most extreme condition, as represented by one Cayamas male, the pronotal disk is entirely rufescent, without the darker lateral blotches of the same area indicated in two specimens from the same locality. The disk is solidly fuscous in all the other specimens before us, although of variable depth, and in all of these and also in one having the center of the disk rufescent, the anal field of the tegmina is uniformly fuscous. We have seen no material of the extremely intensive phase of the species figured in colors by Saussure,[1] in which the tegmina, except for the marginal field, is solidly dark fuscous.

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[1] 1888, Mem. Soc. Zool. France, I, p. 129.

[2] 1887, Anales Soc. Españ. Hist. Nat., XVI, p. 143.

[3] 1903, Trans. Amer. Entom. Soc., XXIX, p. 131.

[4] 1909, Second Rep. Cent. Experim. Station, Rep. Cuba, p. 187.

The styles of the subgenital plate of the male are more variable in this species than in the other West Indian forms. The differences are very difficult to describe and we are figuring styles of three Cayamas specimens to show the range of variation. The dextral style shows more tendency toward variation than the sinistral, which is always relatively short and broad. The dextral style varies in breadth as well as length, also in curvature of its surface, while both vary to some extent in the marginal spinulation. In character, however, the form of the styles is not liable to be confused with that of any species except *dorsalis*, and comparisons are here made under that species.

Plectoptera dorsalis (Burmeister)

Plates XXI, Figure 5; XXII, Figures 7, 13 and 14; XXIII, Figures 4 and 5

A[*naplecta*] *dorsalis* BURMEISTER, 1838, 'Hand. der Entom.,' II, abth. II, pt. 1, p. 494. Sex?; Porto Rico.

PORTO RICO.—Mayaguez, Department of Mayaguez, VI, 22, 1915, VII, 25, 1914, (Lutz and Mutchler; sweeping grass and weeds: H. G. Barber; beating about Experiment Station premises), 1♂, 2♀. Maricao, Department of Mayaguez, VII, 2, 1917, (Harold Morrison), 1♀, [U. S. N. M.]. Arecibo, Department of Arecibo, III, 1 to 4, 1915, VI, 24 to 26, 1915, (Lutz and Mutchler; beating coffee and bananas: Lutz; in flowers of *Ipomæa tilliasea*), 2 ♂. Cayey, Department of Guayama, V, 30 to 31, 1915, (Lutz and Mutchler; beating caladium, etc., in arroyo near town), 1 ♀. Aibonito, Department of Guayama, VI, 2, 1915, VII, 17, 1914, (H. G. Barber, Lutz and Mutchler; beaten from vegetation) 4 ♂, 3 ♀.

This species, which has not been clearly recognized since its description, is the Porto Rican member of the *porcellana* Group. The color pattern is essentially the same type as found in *porcellana*, the tegmina basically having a finely punctulate mosaic-like light and dark pattern. As a whole it is a generally paler insect than the Cuban *porcellana*, with the pronotal disk more rarely (the Mayaguez ♀) solidly fuscous in coloration, although six of the specimens from Mayaguez, Arecibo and Aibonito show lateral fuscous sections on the disk, separated by the ochraceous or ochraceous-orange shade seen to color the disk solidly in all the other specimens.

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[1] 1870, Miss. Scient. Mex., Rech. Zool., VI, Pl. xxi, fig. 50.

One male specimen from Arecibo and two (♂ and ♀) from Aibonito have the anal field of the tegmina solidly and contrastingly fuscous, while another Aibonito female has marked traces of the same condition. The two Mayaguez females average darker than the specimens of both sexes from other localities, and more nearly approximate the uniformly dark type found in *porcellana.* Of the specimens with solid dark tegminal anal fields, none have solidly dark pronotal disks, one is of the uniformly pale ochraceous type and the others have lateral dark blotches on the pronotal disk. This demonstrates that these tendencies respond to different stimuli, and are probably independent and uncorrelated genetic features.

When compared with those of *P. porcellana* the styles of the male subgenital plate are more bulbous and less flattened, tapering to the distal apices, directed dorsad, and with the margin of the plate between the styles developed into an acute production. The apical section of the styles bears several spinulations. The sinistral style is more robust than the dextral, the latter being set in a more longitudinal plane. Reference should be made to the figures accompanying this paper for a clear understanding of the stylar form.

The species is known only from Porto Rico. Gundlach reported *P. porcellana*[1] from that island, which record evidently relates to the present insect. Gundlach states it lives under the loose bark of dead trees and at night enters houses, attracted by the light.

Plectoptera pygmæa (Beauvois)

Plates XXI, Figures 6 and 7; XXII, Figure 8; XXIII, Figure 6

Blatta pygmæa Beauvois, 1805, 'Ins. Rec. Afr. et Amer.,' p. 184, Orth., Pl. I*b*, fig. 9. Sex?; St. Domingo.

Hispaniola.—San Francisco Mountains, Dominican Republic, IX, 15, 1905, (A. Busck), 1 ♂, [U. S. N. M.].

Jamaica.—Stony Hill, St. Andrew Parish, X, 25, 1913, (M. Hebard; beaten from forest foliage), 1 ♂, [Hebard Cln.]. Near Troja, St. Catherine Parish, V, 15, 1904, (A. E. Wight), 1 ♂, [M. C. Z.]. Montego Bay, St. James Parish, III, 6, 1911, (J. A. Grossbeck; beaten from shrubbery), 1 ♀.

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[1] 1887, Anales Soc. Españ. Hist. Nat., XVI, p. 143.

The single specimen from Hispaniola has been dried from alcohol and in consequence its color pattern largely destroyed, the stylar genital features also much observed by distortion. There is no valid reason, however, for considering the material from the two islands as distinct, although the present is the only species known to occur in any two of the Antilles.

When compared with Beauvois' figure the Hispaniolan specimen agrees very well, after allowance is made for the antiquity of the figure. The texture of the lithographic stone, intentionally or otherwise, has imitated with fair fidelity the pattern of our Hispaniolan male. The pronotal disk is pale in the latter specimen, while in the Jamaican individuals it is solidly cinnamon-brown in one, with the center of the disk ochraceous, flanked laterad with cinnamon-brown, in another, and similar to the latter condition but with no pale marginal bordering in the Troja male. The anal field of the tegmina shows no infuscation in the Hispaniolan male, in the Stony Hill male there is but a small dark area at the apex of the field, while the Troja male has this area somewhat larger. The Montego Bay female, however, has the anal field with its distal half solidly cinnamon-brown.

The styles of the males examined show some differences, but we feel they furnish no valid reason why the specimens should not be referred to the same species. The San Francisco Mountains specimen has the dextral style somewhat shrivelled and distorted, so that it is exceedingly difficult to compare it satisfactorily with that from Stony Hill. In consequence we are figuring solely the Jamaican male, and an examination of this illustration (Plate XXIII, fig. 6) will show the stylar features better than a description. The sinistral style is somewhat thicker and heavier in the latter than in the Hispaniolan specimen, and the inter-stylar section of the margin of the subgenital plate has the median lobulation narrower in the San Francisco Mountains male than in the one from Stony Hill. These differences, however, are less than we find as individual variations in *P. porcellana*, and until we can examine more and perfect Hispaniolan material we prefer to refer the material from the two islands to the same species. Beauvois states the species occurs in forest, and the junior author secured it by beating foliage of the relatively dense forest at Stony Hill, Jamaica.

Plectoptera rhabdota,[1] new species[2]

Plates XXI, Figures 8 and 9; XXII, Figure 9; XXIII, Figure 7

A species characterized by possessing a marked pale lineolate pattern on proximal two-fifths of tegmina, distad of which the pattern is made up of closely placed but irregularly shaped vermiculations; a dark line between the eyes is bordered ventrad by a line of whitish. The nearest relatives is *P. perscita*, described and compared below. The styles of the male subgenital plate are distinctive in shape, for details of which the student is referred to the accompanying figures.

TYPE.—Male; San Juan, Department of San Juan, Porto Rico. July 11, 1914. (H. G. Barber; sweeping over mixed vegetation.) [New York Academy of Sciences; American Museum of Natural History.]

Size moderately small (for genus); form of usual convex type, but somewhat more deplanate than in *P. porcellana;* surface polished, shining.

Head visible cephalad of pronotum for nearly its entire width; in form trigonal, greatest width across eyes slightly surpassing greatest depth of head; occipital outline very faintly convex; interspace between eyes broad, at narrowest point but slightly less than that between antennal scrobes; eyes appreciably prominent, strongly arcuate reniform when seen in cephalic aspect.

Pronotum transverse elliptical, with a sub-hexagonal tendency, due to lateral margins being sub-obtuse-angulate; greatest length of pronotum contained about twice in greatest width of same; cephalic margin of pronotum very faintly convex, passing rather narrowly to the sub-obtuse-angulate lateral margins, which in turn pass by a rounded obtuse angle into the distinctly angulate caudal margin: in transverse section the pronotum is distinctly arcuate, more strongly decurved laterad.

Tegmina very narrowly surpassing apex of abdomen, the two when in repose and seen from dorsum elliptical in outline; their individual width contained about two and one-half times in greatest length of same; apices of tegmina narrowly rounded acute-angulate: marginal field relatively narrow, sharply defined; anal field indicated by venational color pattern, elongate pyriform: venation, as evidenced by color pattern, having discoidal and ulnar veins subparallel, former with seven to eight well-spaced rami diverging toward costal margin; ulnar vein with four rami obliquely diverging toward sutural margin; axillary veins six to seven in number.

Subgenital plate of male with interstylar portion of margin with an acute, conical, linguiform production, approximately half as long as styles: styles relatively short, robust plates, their length but little greater than their width, with ventral surface impressed, internal margins arcuate distad, so that their broad apices appear to diverge, distal section of styles with sparse chætiform hairs, details of the styles are shown in Plate XXIII, figure 7. Cerci relatively short, fusiform, moderately depressed.

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[1] I. e., ῥαβδωτή, striped.

[2] This species is in all probability that reported by Gundlach (1887, Anales Soc. Españ. Hist. Nat., XVI, p. 143) from Porto Rico, as *krugii* Saussure and Zehntner did not describe *krugii* until 1893 and the name was applied by them to Cuban material. Saussure doubtless examined material for Gundlach. and supplied him with the manuscript name. The present species bears a considerable superficial resemblance to that phase of the Cuban *P. porcellana* to which we consider the name *krugii* was applied, Rehn (1903, Trans. Amer. Entom. Soc., XXIX, p. 131) recorded the present species from Mayaguez, Porto Rico as *porcellana*.

Cephalic femora with ventro-cephalic margin bearing a series of minute, short, chætiform hairs, ventral margins of median and caudal femora supplied only with scattered elongate chætiform hairs. Tarsal claws unequal, the more elongate one with flexor margin bearing five denticulations, arolia relatively large.

Allotype.—Female; Aibonito, Department of Guayama, Porto Rico. July 14 to 17, 1914. (H. G. Barber.) [New York Academy of Sciences; American Museum of Natural History.]

Differing from the above description of the male in the following features:

Interspace between eyes very broad, equal to that between antennal scrobes. Subgenital plate broad, transverse, distal margin arcuato-truncate.

General base color of pronotal disk and discoidal and anal fields of tegmina ranging from yellow-ochre through raw sienna to argus brown; lateral portion of pronotum, narrow cephalic and caudal margins of same and marginal field of tegmina clear hyaline to washed partially or completely with opaque whitish. Pronotal disk in about one-half of specimens with paired lateral areas darker than pale central section, darker, quite solid and extensive in some individuals, weaker and more nebulous in others, no indications of dark areas in a few. Venation of discoidal and anal fields of tegmina completely pencilled in opaque cream-color, areas between the veins and their rami in distal three-fifths filled by a complicated and minutely vermiculate pattern of the same color, the elements of which have as a whole tendencies of disposition paralleling the veins, anal field with interaxillary punctulato-lineations. Head of the same general color as the pronotal disk, more specifically of the median section of same; interocular bar opaque creamy white, relatively broad, relieved along dorsal margin by a slight darkening of general color of head; eyes blackish fuscous. Venter of thorax and abdomen ranging from light ochraceous-buff to mummy brown, in direct ratio to depth of dorsal color tone, on abdomen frequently with broad paler lateral borders, which occasionally in very recessive individuals (type) also completely encompass the distal margins of the sternites. Cerci always pale; subgenital plate of female with intercercal section of margin broadly pale margined. Limbs, distal section of coxæ, palpi and antennæ light ochraceous-buff to ochraceous-buff.

The uniformly pale pronotal disk is not always associated with a pale base color of the tegmina, although generally so, the relatively dark Jayuya female having a solidly pale disk. The paler limb color is also not always correlated with a general lightening of color tones. The opaque lineation of the teminal venation is always indicated, although more apparent in the individuals of pale or moderately dark coloration.

Male (type).—Length of body, 5.12 mm.; length of pronotum, 1; greatest width of pronotum, 1.93; length of tegmen, 4.11.

Female (allotype).—Length of body, 5 mm.; length of pronotum, 9.2; greatest width of pronotum, 1.8; length of tegmen, 4.45.

In addition to the type and allotype the following material, all of which may be considered paratypic, is before us.

San Juan, Department of San Juan, Porto Rico, VII, 11, 1914, (H. G. Barber; sweeping over mixed vegetation), 1 ♂: VI, 24, 1917, (Harold Morrison), 1 ♀, [U. S. N. M.].

Vega Alta, Department of San Juan, Porto Rico, II, 21, 1917, (on grape-fruit tree), 1 ♂, [Porto Rico Dept. Agr.].

Rio Piedras, Department of Humacao, Porto Rico, VI, 22, 1906, (H. G.Smyth; on guava (*Psidium guayava*), 1 ♀, [Porto Rico Dept. Agr.].

Jayuya, Department of Arecibo, Porto Rico, I, 6, 1915, (H. E. Crampton; bushes and shrubs), 1 ♀.

Arecibo, Department of Arecibo, Porto Rico, VI, 24 to 26, 1917, (A. G. Mutchler), 1 ♀ (abdomen missing).

Mayaguez, Department of Mayaguez, Porto Rico, I, 1899, (A. Busck), 1 ♂, [U. S. N. M.[1]]: IV, 26, 1912, (C. W. Hooker), 1 ♀, [U. S. N. M.].

Lares, Department of Aguadilla, Porto Rico, IV, 16, 1922, (F. Seín; in nest of larvæ of *Tetralopha scabradella*), 1 specimen, apex of abdomen missing, [Porto Rico Dept. Agr.].

Aibonito, Department of Guayama, Porto Rico, VII, 14 to 17, 1914, (H. G. Barber), 1 ♂, 1 ♀.

St. Thomas, Virgin Islands, VI, 5, 1917, (Harold Morrison), 1 ♂, [U. S. N. M.].

Swept Magen Bay, St. Thomas, Virgin Islands, VI, 3, 1917, (Harold Morrison), 1 ♂, [U. S. N. M.].

These specimens show no features of individual variation other than those noted above under coloration. The species is, apparently, one of fairly wide distribution in Porto Rico, possible occurring as well in all of the larger members of the Virgin group.

Plectoptera perscita,[2] new species

Plates XXII, Figures 1 and 10; XXIII, Figure 8

Plectoptera poeyi Caudell, 1914, (not of Saussure), Proc. U. S. Nat. Mus., XLVII, p. 491. ♀; Dominica.[3]

A member of the same species group as the Porto Rican *P. rhabdota*, described above, possessing the same elements in its color pattern, but differing chiefly in the more strongly transverse head, the tegminal color pattern having many irregular and broken transverse intervenous pale lineolations, also marked infuscation of the distal sections of the costal veins of the tegmina; the styles of the male subgenital plate are very distinctive, being larger than in any other West Indian species known to us, the sinistral one also embracing the dextral. For the form of the styles the student is referred to fig. 8 on plate XXIII. While the type is unique and thus we are not able to judge definitely whether the features of the pattern mentioned above are not subject to variation, we assume, from analogy in *P. rhabdota*, that the opaque whitish features are less liable to variation than tonal depth. The form of the styles, however, will immediately distinguish the males of the two species.

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[1] This is the specimen reported by Rehn (1903, Trans. Amer. Ent. Soc., XXIX, p. 131) as *P. porcellana*.

[2] I. e., very pretty.

[3] Since preparing the accompanying description of *perscita* we have been able to examine the single female from Dominica, bearing the data "June-July, H. W. Foote, Yale Exp. 1913," which was recorded by Caudell as *poeyi*. It is dismembered, in a Riker mount, and as far as can be told from the sex, and a specimen in that condition, is the present species. It is clearly not *poeyi*, nor *dominicæ*, here described, and it has the characteristic pattern of *perscita* indicated, although more weakly than in the type.

TYPE.—Male; Laudet, Dominica. June 11, 1911. (F. E. Lutz; beaten from moss-covered lime trees.) [American Museum of Natural History.]

Size moderately small (for genus); form as usual in genus; surface polished and shining.

Head visible cephalad of pronotum for almost its entire width; in form trigonal, appreciably transverse, greatest width across eyes equal to one and one-half times greatest depth of head; occipital outline very faintly convex, interspace between eyes but slightly less than that between antennal scrobes, and subequal to two-fifths of greatest width of head; eyes quite prominent, very strongly reniform arcuate as seen from cephalic aspect.

Pronotum of same type as *P. rhabdota.*

Tegmina surpassing apex of abdomen by nearly length of pronotum, the two when in repose and seen from dorsum elongate elliptical, their individual width contained three times in greatest length of same; apices of tegmina well rounded acute angulate; anal field, as indicated by pattern, elongate pyriform: venation of same genera type and indication as in *P. rhabdota;* discoidal vein with six to seven rami toward costal margin; ulnar vein with five rami obliquely diverging toward sutural margin; axillary veins five to six in number.

Subgenital plate moderately produced mesad, deeply and strongly arcuate emarginate at the insertion of the styles: styles large, deplanate, set obliquely, sinistral embracing considerable of the dextral; sinistral style subconical in outline or with apex rectangulate, distal section appreciably bent over the adjacent portion of the dextral one, distal margin with two and internal margin with one pronounced, erect spines and adjacent ventral surface with a number of chætiform hairs; dextral style in outline less trigonal than sinistral, distal and disto-lateral margin regularly arcuate, internal margin nearly straight, distal margin with two erect teeth and scattered chætiform hairs.

Femora with ventral margins as in *P. rhabdota.* Tarsal claws and arolia as in *P. rhabdota*, but former with finer denticulations.

General color light ochraceous-buff, the overlying pattern being cinnamon-brown. Head with a broad interocular bar of cinnamon-brown, face with three blotches of the same color arranged arcuately in a transverse fashion, dorsad of this is a pair of small dots of the same color; eyes fuscous; antennæ of general color with segments narrowly banded distad with cinnamon-brown, this more evident distad, very weakly so proximad. Pronotum with disk bearing a pair of lateral blotches of cinnamon-brown, separated by an interval wider than a single blotch and light ochraceous-buff in color; lateral sections of pronotum nearly clear hyaline,[1] narrow cephalic and caudal margins weakly creamy white opaque. Tegmina with discoidal and anal fields nearly solidly cinnamon-brown as a base color, this weaker in the scapular region, the lineation of the venation decided and of the general color, the axillary and costal veins, and the rami of the ulnar veins, as well as the ulnar vein itself, with many lateral venules pencilled for some distance from the basic nervure, this producing a markedly hatched pattern, augmented by intervenal lineations and irregular vermiculations; costal veins with the vicinity of their distal portions appreciably infuscated: marginal field of the general base color, unmarked. Venter largely buckthorn brown, clouded on pleura and coxæ, as well as on disk of abdomen, with cinnamon-brown. Limbs of general color; tibiæ with vicinity of insertion of spines, particularly of extensor surface, marked with cinnamon-brown.

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[1] Possibly these areas were more opaque in life.

Length of body, 5.62 mm.; length of pronotum, 1.09; greatest width of pronotum, 2.01; length of tegmina, 4.78.

The type of this beautiful and most interesting form is unique. Whether the species will be found in other islands of the Lesser Antilles remains to be determined.

Plectoptera vermiculata,[1] new species[2]

Plates XXII, Figures 2 and 11; XXIII, Figure 9

Plectoptera poeyi Rehn, 1909, Sec. Rep. Cent. Exper. Sta. Rep. Cuba, p. 186 Cayamas, Cuba. (In part.)

This species is a close relation of *P. lacerna*, described below, the two comprising a group so far as known restricted in distribution to Cuba. The color pattern of the group consists on the discoidal and anal fields of the tegmina of a mosaic pattern coarser and fainter than found in the *Porcellana* Group, the pronotal disk never dark and the anal field of the tegmina never solidly infuscate. The tegminal pattern has no indication of the lineolate pattern so evident in the *Rhabdota* Group. Certain of the material of the present species has little or no indication of the tegminal pattern, but from the condition of the specimens this appears to be due to the method used in their preservation. The differences between *vermiculata* and *lacerna* are given under the latter species.

Type.—Male; Cayamas, Oriente Province. Cuba. March 13. (E. A. Schwarz.) [United States National Museum.]

Size medium small (for genus); form as usual in genus; surface markedly polished.

Head evident cephalad of pronotum for virtually its entire width; in facial view head outline is trigonal, faintly broader than deep; occipital outline very faintly convex, interspace between eyes faintly greater than one-third of entire width of head: eyes moderately prominent but strongly arcuate in outline, their general form, seen from venter, strongly arcuato-reniform.

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[1] I. e., inlaid like a mosaic, in allusion to the very delicate tegminal pattern of this species.

[2] The queried Cuban record by Saussure and Zehntner (1893, 'Biol. Cent.-Amer., Orth.,' I, p. 84), of *unicolor* Burmeister, a species described from Colombia and which can hardly be satisfactorily placed generically until the type has been examined, probably relates either to this species or *lacerna*, described below.

Pronotum transverse elliptical, greatest length contained one and five-sixth times in greatest width of same; cephalic and caudal margins distinctly but not strongly convex, the latter slightly more arcuate than former, both passing into lateral margins without really appreciable angles; lateral margins rounded subobtuse angulate; in transverse section regularly arcuate.

Tegmina very slightly surpassing apex of abdomen, the two together (with pronotum) in repose sub-elliptical: character of fields and vein disposition as usual in genus, except that anal field is relatively more narrowly elongate than in *Porcellana* Group; costal veins nine in number, regularly disposed; ulnar rami toward sutural margin not as clearly evident as costal veins; ulnar sulcus, as indicated by pattern, straight oblique in distal three-fourths.

Subgenital plate faintly asymmetrical, medio-distal emargination decided, concave: styles inflated, bulbous, sinistral appreciably larger than dextral, each with a single distal spine; between stylar bases is situated an aciculate spiniform structure, slightly more than half as long as styles. Cerci simple, rather broad in form, apices sharply acute.

Tarsi with claws strongly asymmetrical, caudal claw much larger compared with very short cephalic claw, its internal margin with a distinct proximal shoulder and two marginal teeth; arolia relatively very large.

ALLOTYPE.—Female; Cayamas, Oriente Province, Cuba. June 6. (E. A. Schwarz.) [United States National Museum.]

Differing from the above description of the male in the following features. Interspace between eyes equal to half entire width of head. Pronotum faintly more transverse, greatest length contained about twice in greatest width of same. Wing, detached and spread in allotype, of the same character and with same venational and areal distribution as *P. porcellana*, except that appendicular field is narrower and faintly shorter, its length being slightly less than that of major portion of wing, while its apex is sharper and its margins less arcuate. Subgenital plate very ample, transverse, its distal margin weakly convex between the cerci.

General color of pronotal disk light ochraceous-buff; base color of anal and discoidal fields of tegmina ochraceous-tawny with an overlying, anastomosing neurational pattern of light ochraceous-buff; lateral portions of pronotum and marginal field of tegmina nearly hyaline pale ochraceous-buff. Head pale ochraceous-tawny, with a broad, interocular line of opaque whitish, bordered dorsad by a delicate but not sharply indicated pencilling of tawny; lower face with a transverse figure of opaque creamy white, occasionally divided mesad; antennæ ochraceous-buff with a touch of salmon; eyes cinnamon-brown. Pronotum with intimations of paired areas of tawny on disk. Tegminal pattern cribrose, meshed, not punctulate as in the *Porcellana* Group, the areolæ between the veins and rami filled with pale lines, generally anastomosing. Pleura of venter russet; coxæ and limbs light ochraceous-buff; venter of abdomen russet to deep mars brown, sometimes (as in male type) almost completely overlaid with a dense opaque frosting of whitish, the base color of this surface showing through obscurely along the median line and sharply in paired lateral subtrigonal spots, set a distance inside of the lateral margins; or with a broad lateral margin of the segments, a narrower distal margining of the subgenital plate and also of the distal margins of the distal abdominal segments (as in allotype). Cerci tawny to deep mars brown, pale-edged and tipped.

MEASUREMENTS

	Length of Body	Length of Pronotum	Width of Pronotum	Length of Tegmen
♂, Cayamas, Cuba, type	6.63	1.09	2.10	4.87 mm.
♂, Cayamas, Cuba, paratype	5.62	1.12	2.01	5.04
♂, Twelve and one-half kilometers south of Pinar del Rio, Cuba	5.12	1.04	1.97	4.53
♀. Cayamas, Cuba, allotype	4.45	1	2.18	4.36
♀, Cayamas, Cuba, paratype	5.46	1.09	2.01	4.87
♀, Twelve and one-half kilometers south of Pinar del Rio, Cuba	4.36	1.17	2.10	4.45

In addition to the type and allotype we have before us the following material.

Cayamas, Oriente Province, Cuba, May 7 and June 6, (E. A. Schwarz), 2 ♂, 1 ♀, *paratypes*, [United States National Museum].

Twelve and one-half kilometers south of Pinar del Rio, Pinar del Rio Province, Cuba, September 12 to 23, 1913, (F. E. Lutz and C. W. Leng; beaten from pine in pine-palmetto region), 4 ♂, 1 ♀.

We have considered solely the Cayamas specimens as paratypic, as certain differences in the other material are noticeable. All agree, however, in the fundamental genitalic features, and we have every reason to feel but a single species is represented. The chief difference noted is that the specimens from south of Pinar del Rio lack the markedly mosaic pattern of the tegmina of Cayamas individuals, and in general these members are nearly hyaline pale tawny. In certain lights, however, traces of the mosaic pattern can be seen, and we feel that the method of killing or preserving this material may have altered the pattern, particularly as the general decoloration has in several of them rendered subobsolete the striking opaque whitish of the interocular region and the ventral abdominal surface, also diluted the base color of the pleura and venter of the abdomen. The cerci are sometimes entirely pale, and the whole series shows considerable variation in the extent of the whitish overlay on the marginal bordering of the abdominal sternites.

Plectoptera lacerna,[1] new species[2]

Plates XXII, Figures 3 and 12; Figure XXIII, Figure 10

A close relative of *P. vermiculata*, described above, and like it a Cuban insect, but differing chiefly in the form of the styles of the male subgenital plate, these being compressed and claw-like, quite different from the inflated type found in *P. vermiculata*. The color pattern of the venter of the abdomen and a sprinkling of appreciable brown dots on the tegmina are distinctly different from the conditions found in *P. vermiculata*.

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[1] I. e., a mantle, in allusion to the appendicular field of the wing in this genus.

[2] See footnote 2, page 309, relative to the record of *P. unicolor* Burmeister from Cuba, by Saussure and Zehntner, which may refer to this species.

TYPE.—Male; Merceditas, fourteen kilometers north of Viñales, Pinar del Rio Province, Cuba. September 20, 1913. (F. E. Lutz; swept from grasses, sedges, etc., about a water hole.). [American Museum of Natural History.]

Size small (even for genus); form elongate elliptical; surface shining.

Head visible cephalad of pronotum for virtually its entire width; when seen in facial aspect depressed trigonal, greatest width of head across eyes appreciably greater than greatest depth of head; interocular occipital outline nearly straight truncate, interspace between eyes equal to but slightly less than half entire width of head; outline of eyes strongly arcuate, moderately prominent, general form of eyes when seen from face reniform arcuate.

Pronotum transverse elliptical, greatest length contained approximately one and two-thirds times in greatest width of same, of the general type found in *P. vermiculata*.

Tegmina as described as *P. vermiculata*.

Subgenital plate weakly asymmetrical, dextral section of margin with emargination more decided and concave than of sinistral portion of margin, medio-distal section of margin briefly convex: styles compressed, subvertical in position, unguiculate, particularly dextral, latter more compressed than sinistral which is shorter and more bluntly rounded at apex, dextral aciculate at apex; internal surface of subgenital plate between styles with a recurved, caudad directed spiniform process.

Tarsal claws and arolia much as in *P. vermiculata*.

General color of the head and pronotal disk light ochraceous-buff to ochraceous-buff, passing to weak buckthorn brown on the discoidal and anal fields of the tegmina. Head with occiput washed with ochraceous-tawny, finely pencilled interocular line opaque whitish; antennæ and palpi of general color; eyes mars brown. Pronotal disk occasionally (*paratype*) with periphery of disk laterad and caudad broadly but not very deeply tinted with cinnamon-brown; lateral portions of pronotum and marginal field of tegmina pale yellowish hyaline. Pattern of tegmina caused by a pencilling of the venation, more particularly the principal veins, with hyaline light ochraceous-buff, the areolets buckthorn brown of variable depth and strength, thus affording the color contrast which emphasizes the pattern; in addition there is a regularly distributed but well-spaced pattern of small but marked dots of mars brown, which are situated chiefly on or very near the discoidal, costal and ulnar veins, those on the costal placed regularly one on each vein at equal distance from costal margin; vicinity of apex of anal sulcus weakly infuscate with mars brown. Limbs ochraceous-buff. Venter of abdomen with disk tawny, narrowly russet to mars brown in contact with lateral opaque white fasciæ, placed at a uniform distance from the lateral margins, the section between the fasciæ themselves and the margins pale ochraceous-tawny to pale mars brown; subgenital plate without white.

Measurements

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen
♂, Merceditas, fourteen kilometers north of Viñales, Cuba, type....	4.78	1	1.76	4.2 mm.
♂, Cerro Cabras, Cuba, paratype..	5.29	1.09	1.59	4.03

In addition to the type of this interesting species we have before us a single paratypic male, taken at Cerro Cabras, near Pinar del Rio, Pinar del Rio Province, Cuba, September 11, 1913, by F. E. Lutz (sweeping grass pines and oak), and from the American Museum collection. This specimen has been considerably damaged but is perfectly typical of the species, its measurements being given above. Its coloration is somewhat more intensive then that of the type, as evidenced by the above color description.

Plectoptera poeyi (Saussure)[1]

Bl[atta] poeyi Saussure, 1862, Rev. et Mag. de Zool., (2) XIV, p. 164. ♂; Cuba.

Plectoptera floridana Hebard, 1917, Mem. Amer. Entom. Soc., No. 2, pp. 16, 251, Pl. x, figs. 9–12. ♂, ♀; Big Pine Key and Key West (type locality), Florida.

Cuba.—Güines, Havana Province, III, 29, 1903, (A. E. Schwarz), 1 ♀, [A. N. S. P.].

The junior author's description of *P. floridana* was due to a misconception of *poeyi* of Saussure. The material at that time referred to *poeyi*, as we now know, was composite, and the males used for comparison were *P. vermiculata*, here described, which from features of its coloration we are now convinced could not be the true *poeyi*. The latter species is said to have the "vertice linea tenui perfusca; abdomine rufescente margine et segmentorum limbo albido," which features are not, in an exact sense, those of *vermiculata*, but are of *poeyi* as here understood. Again the tegmina of *poeyi* are, by inference, unmarked and "pallide testacea," which is not true of properly preserved *P. vermiculata*. The important genital features were, of course, not mentioned by Saussure. But a single male of *poeyi* from Cuba is now before us, and this may not have been examined when *floridana* was described, while quite a few males of *vermiculata* were available. The description and figures of *floridana* given by Hebard (vide supra) precludes the necessity of a redescription of this species. The male before us has the coloration of the ventral surface of the abdomen exactly as bescribed by Saussure.

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[1] The senior author's record of *poeyi* from Cayamas, Cuba (1909, Second Rep. Cent. Exper. Sta. Rep. Cuba, p. 186), is in part this species and in part *vermiculata*. The Havana record in the same paper is probably correct, but the material cannot be located for reëxamination. The specimen from Vieques Island recorded as *poeyi* by Rehn (1903, Trans. Amer. Entom. Soc. XXIX, p. 131) we are unable to locate, so its position in the light of present day knowledge cannot be determined. It probably, however, represents *P. infulata* described below. Caudell's record of *poeyi* from Dominica (1914, Proc. U. S. Nat. Mus., XLVII, p. 491) we now know refers to *P. perscita*, which see (page 307).

The species is definitely known only from extreme southern Florida (i. e., the Keys and the mainland at Cocoanut Grove), and the island of Cuba. For comments on records from elsewhere see footnote 1 on page 307, page 309 and footnote, on page 313, as well as below. We are unable to offer any explanation for the occurrence of this species in Florida except to affirm our belief that its presence there is in no way due to the influence of man. *Poeyi* in Florida is a species of strictly unaltered natural conditions and not of those areas which have been disturbed by human agencies. The information available shows it occurs adult, in Florida at least, from January to early July. We know nothing of its habits in Cuba, but on the Florida Keys it frequents dry scrubby vegetation, particularly *Ilex cassine.*

Plectoptera infulata,[1] new species[2]

Plate XXIII, Figure 11

This species needs comparison solely with *P. poeyi* and *dominicæ,* which are its nearest relations. Like these, *infulata* possesses uniformly colored tegmina and the pronotal disk is not decidedly contrasted with the coloration of the tegmina. From *poeyi* the present species can be distinguished by the much greater interocular space in both sexes, which also has a whitish transverse line as conspicuous as the more dorsal dark line, and by the different subgenital plate of the male, which has very distinctive enlarged styles (see Pl. XXIII, fig. 11), in no way resembling those of *P. poeyi.*

TYPE.—Male; Mayaguez, Department of Mayaguez, Porto Rico. July 28, 1914. (H. G. Barber; in grounds of Experiment Station.) [New York Academy of Sciences; American Museum of Natural History.]

Size medium (for genus); form elongate elliptical, dorsal surface convex as usual in genus; surface moderately polished and shining.

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[1] I. e., wearing the infula or head-band, in allusion to the interocular color band found in species of the genus.

[2] The record of *P. poeyi* from Vieques Island, (Rehn, 1903, Trans. Amer. Ent. Soc., XXIX, p. 131) may refer to this species. There seems every probability the material then examined does not belong to the Cuban and Floridian *poeyi.* The specimen cannot be located at this writing, so the exact disposition of the record must await future study. Gundlach recorded *P. unicolor* Burmeister, a Colombian insect of uncertain relationship, from Porto Rico. There seems every probability this refers to *infulata,* the only uniformly colored member of the genus known from that island.

Head narrowly visible cephalad of pronotum for almost its entire width: seen in facial aspect head outline is subtrigonal, greatest width across eyes about one-fourth more than greatest depth of head; occipital outline in same view subtruncate; interspace between eyes very broad (for male sex), equal to but faintly less than one-half of greatest width of head: eyes moderately prominent, arcuate reniform in outline.

Pronotum strongly transverse elliptical, its greatest width slightly more than twice the greatest length of same; cephalic and caudal margins very broad arcuate, passing by a well-rounded obtuse angle (caudad) or without an appreciable angle (cephalad) into the convex lateral sections of the margins, which show in their middle an extremely faint angulate tendency; in transverse section the pronotum is decidedly convex, with lateral portions more sharply declivent.

Tegmina of the type usual in the genus, slightly surpassing apex of abdomen, with vein definition as in *P. poeyi*.

Subgenital plate slightly asymmetrical but general features of its margin are balanced; laterad of styles are distinct infra-cercal concave emarginations; mesad the margin is developed into a broad linguiform projection shorter than the styles, which is arcuate distad and there supplied with hooked spinulations: styles relatively short and broad, basal width subequal to length, somewhat inflated on ventral surface, ventrad and distad with a few erect spinulations; dextral style slightly smaller and more narrowed proximad than sinistral. Tarsal claws unequal, ventral margin serrulate: arolia large.

ALLOTYPE.—Female; Aibonito, Department of Guayama, Porto Rico. July 17, 1914. (H. G. Barber; beating.) [New York Academy of Sciences; American Museum of Natural History.]

Differing from the description of type in following noteworthy features.

Interspace between eyes extremely broad, equal to approximately five-eighths of greatest width of head. Subgenital plate large, transverse; distal margin equal to three-fourths of greatest width of plate, transversely truncate.

General color of dorsal surface ranging from mustard yellow (type) to yellowish citrine, lateral sections of pronotum and marginal field of tegmina nearly clear hyaline. Ventral color ranging from pale tawny with abdominal sternites largely clouded with pale ochraceous-buff (type) to cinnamon-brown with abdominal sternites and subgenital plate very broadly margined laterad and distad with pale ochraceous-buff. This latter coloration is that of most of the females, but one from Cayey is more as described for the type. Interocular bar double, above finely lineate with tawny (type) to cinnamon-brown, below, and in contact with darker band, with a broader band of pale ochraceous-buff, this weaker in the type than in the other specimens: eyes cinnamon-brown to prout's brown. Limbs (including coxæ) light ochraceous-buff to ochraceous-buff.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen
♂, Mayaguez, Porto Rico, type...	5.29	1.3	2.1	4.95 mm.
♂, Aibonito, Porto Rico, allotype..	5.54	1.26	2.18	5.04
♂, Cayey, Porto Rico, paratype...	5.46	1.17	2.1	4.87
♂, Cayey, Porto Rico, paratype...	5.12	1.34	2.22	5.2

In addition to the type and allotype we have before us the following material.

Aibonito, Department of Guayama, Porto Rico, July 15 to 16, 1914, (H. G. Barber), 1 ♂, 1 ♀, paratypes.

Cayey, Department of Guayama, Porto Rico, May 30 to 31, 1915, (Lutz and Mutchler; beating caladium, etc., in arroyo near town), 3 ♀, paratypes.

Rio Piedras, Department of Humacao, Porto Rico, May 20, 1923, (G. N. Wolcott; at light), 1 ♀, paratype, [A. N. S. P.].

These specimens show no important differences except in the color tone, which has been discussed in the color description. It may be summarized as a yellow extreme tone on one hand and an olive-greenish tendency on the other. One female from Cayey has an oötheca partially protruding from the body, this being carried with the carina dorsad, the latter crenulato-dentate in profile.

Plectoptera dominicæ, new species

Plate XXIII, Figures 12 and 13

A very distinct species of the genus, having a simple type of styles of the subgenital plate of the male, such as is found in no other species of the genus we have examined. It is a member of the pale section, typified by *poeyi*, but its generalized subgenital plate and styles will readily differentiate it from *poeyi* and *infulata*.

TYPE.—Male; Laudet, Dominica. June 11, 1911. (F. E. Lutz; beaten from moss-covered lime trees.) [American Museum of Natural History.]

Size median (for the genus); form elongate elliptical, moderately convex dorsad; surface moderately shining.

Head visible cephalad of pronotum for nearly its entire width; in facial aspect head is seen to be trigonal in outline, its greatest width very faintly greater than the depth of the head; occipital outline arcuato-truncate; interspace between eyes slightly greater than one-third of greatest width of head; eyes moderately prominent, narrow when seen in cephalic aspect, strongly arcuate-reniform in outline.

Pronotum of the form usual in the genus, transverse subelliptical, greatest length contained nearly twice in greatest width of same; cephalic margin subtruncate, caudal margin moderately arcuate, both passing into lateral margins by well-rounded but evident angles; lateral margins distinctly obtuse-angulate, cephalic section of these margins arcuate, caudal sections straight oblique; in transverse section pronotum is convex with lateral section distinctly declivent.

Tegmina of type usual in genus, surpassing apex of abdomen by slightly less than one-half of length of pronotum; venation as in related species.

Subgenital plate weakly asymmetrical, distal margin moderately produced mesad, lateral sections of margin appreciably concave, median section subtruncate: styles short, simple, apices rounded; dextral style more evident from venter, inserted in marked socket on ventral surface; sinistral style placed on dorsal surface of plate, its exact form more difficult to determine than dextral one. Cerci subfusiform, quite attenuate distad, subdepressed.

Tarsal claws unequal, ventral margin serrulate, Arolia large.

General color of dorsum pale ochraceous-orange, lateral sections of pronotum and marginal field of tegmina clear hyaline. General color of venter pale ochraceous-tawny, paling to light ochraceous-buff on the disk of the pronotum and to antimony yellow on the limbs and antennæ. Faint interocular line light ochraceous-buff; eyes mummy brown.

Length of body, 5.88 mm.; length of pronotum, 1.51; greatest width of pronotum, 2.39; length of tegmen, 5.46.

The type of this most interesting species is unique.

Perisphaerinæ

At least three members of this subfamily are known from the West Indies, representing possibly two genera. Eleven recognized genera have been referred to this assemblage from tropical America, but our knowledge of the relationship of some of them is very unsatisfactory. Certain of the species found in the American tropics are known to be bromeliadicolous. The subfamily is highly developed in the Ethiopian Region, and many species there and in tropical America are greatly modified in structure, with very marked sexual dimorphism.

Two of the species described from the West Indies are referable to the genus *Poroblatta* Hebard, originally described from Colombia. The third species, described from Jamaica by Walker, as *Polyzosteria panesthoides*,[1] is one of the few West Indian species we are unable to place to our satisfaction. Uvarov has very kindly examined Walker's type in the British Museum of Natural History and his comments are as follows:

"*Polyzosteria panesthoides* type is adult ♀; there is no reason to doubt the locality (Jamaica), and as far as I was able to find out it belongs somewhere near *Hormetica*, has the elytra rudimentary like in *Parahormetica* and well developed pulvilli (i. e., arolia) between claws."

The main features of Walker's description we are giving below,[2] in the hope that someone may be able to aid in definitely placing the species.

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[1] 1868, 'Catal. Blatt. Brit. Mus., p. 164.

[2] *Panesthoides* is said to be 17 lines (approximately 34 millimeters) long, tawny, with a large discoidal black patch on the pronotum, which spot is much excavated caudad. The antennæ are described as black, tawny at their bases, toward the apices with a broad testaceous band. The meso- and metathorax are said to have a few black spots and transverse black streaks. The abdomen is black, tawny bordered; underside tawny, darker towards the tip and with blackish patches on each side. Cerci black. Legs short and thick. Wings rudimentary, covering sides of the mesothorax and of the metathorax. Fore wings black, very minutely punctured, tawny towards the free border and along part of the hind border.

Kirby,[1] who examined the type, placed the species in the genus *Blaptica* of the Blaberinæ, a position almost inconceivable if the specimen actually came from Jamaica.

We have seen nothing resembling this insect from the West Indies, and as far as we can ascertain it is probably a species of *Hormetica* or a related genus. The tegminal form suggests *Parahormetica*, while the arolar feature is that supposed to be characteristic of *Hormetica*, which is also suggested by the pronotal and abdominal coloration. However, as we now know that immature individuals of *Hormetica* lack arolia, this single character in the case is of less value as a generic feature. After mature consideration it seems best merely to call attention to the species under the subfamily and attempt no generic association, which to a considerable extent would be guess-work, leaving to the future, when our information is more complete, definite assignment of *panesthoides*. The possibility of the locality being erroneous must also be considered.

POROBLATTA Hebard

This genus was erected[2] for two species from Colombia, *P. cylindrica* and *apatela* Hebard, known solely from females. The West Indian species here referred to *Poroblatta* are so assigned with a full realization that this action is purely tentative, pending the acquisition of full knowledge of both sexes of the species involved. Whether the male sexes of the Colombian *Poroblatta* have abbreviate and lateral tegmina, as is true of the West Indian species, remains to be determined, also whether certain features of the sculpture, etc., are shared by both sexes. The relationship of the West Indian species to *Acroporoblatta* Hebard,[3] another Colombian genus, is less evident, the inflated pronotum of the latter alone being sufficiently distinctive. The third Colombian genus, *Colapteroblatta* Hebard,[4] is very different, having macropterons males with other characteristic features of body and limbs.

The genus *Parasphæria* Brunner,[5] the genotype of which is *P. ovata* (Blanchard), from Chile, and to which Brunner in 1892 and 1893 referred the West Indian species, like *Colapteroblatta* has macropterous males, as well as an ovate pronotum in the same sex, and other features which are in no way indicated in the West Indian material in hand. The other South American genera of Perisphærinæ of authors other than Hebard, are seen, upon examination, to be not at all closely related to the genus found in the West Indies.

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[1] 1904, 'Synon. Catal. Orth.,' I, p. 162.
[2] 1919, Trans. Amer. Entom. Soc., XLV, p. 123.
[3] Idem, p. 126.
[4] Idem, p. 120.
[5] 1865, 'Nouv. Syst. Blatt.,' p. 311.

The two West Indian species, which are black in general coloration with reduced and lateral tegmina in both sexes, may be separated by the following features drawn in large part from the original descriptions.

Surface impresso-punctate, particularly so on the abbreviate tegmina. Limbs rufo-ferruginous in coloration. Length of male, 18.5 mm.; length of female, 28. (St. Lucia and Grenada.) .... *rufipes* (Brunner).

Surface sparsely punctate. Limbs rufo-fuscous. Length of male, 22 mm.; length of female, 33. (St. Vincent.) .... *nigra* (Brunner).

Poroblatta rufipes (Brunner)

Plate XXIV, Figures 4 to 6

P[*erasphæria*] (error for *Parasphæria*) *rufipes* Brunner, 1893, Proc. Zoöl. Soc. London, p. 604, Pl. lii, fig. 3. ♀; Balthazar, Grenada, West Indies.

St. Lucia.—Union, near Castries, IX, 17, 1919, (J. C. Bradley), 1 ♂, [Cornell University].

As the male was previously unknown the following description of the above listed specimen should be of value.

Size medium; form appreciably deplanate on venter, dorsum regularly arcuate in transverse section; surface moderately polished, cribroso-punctate, the largest puncta on the lateral sections of the pronotum, tegmina and meso- and metanotum, on the abdomen the larger puncta are irregularly transverse linear in disposition, the smaller puncta along the segmental bases.

Head almost completely hidden under pronotum, broad, greatest length and breadth subequal, face subdeplanate; occipital outline distinctly arcuate, interspace between eyes very faintly greater than that between antennal scrobes; eyes very faintly elevated above general outline of head, elongate reniform in form; antennæ subequal to half the body in length.

Pronotum subcucullate, cephalad the surface is appreciably impressed dorsad and laterad about the head, which is distinctly embraced by the latero-cephalic sections of the pronotum; in transverse section the pronotum is arcuate, slightly flattened mesad, the lateral intermarginal sections moderately impressed, developing what might be called weak "gutters": general outline of pronotum truncate trigonal, greatest length contained one and one-third times in greatest width, which is caudal; cephalic section truncato-arcuate, laterad narrowly rounding into the diverging moderately arcuate lateral sections, caudal margin subtruncate, caudo-lateral angles very narrowly rounded rectangulate; lateral and cephalic margins cingulate, narrowly so cephalad, progressively more broadly and coarsely so caudad; cribroso-punctations of surface largely grouped laterad.

Tegmina distinctly lateral, sublanceolate in outline, their apices very narrowly surpassing distal margin of mesonotum; costal margin arcuate, thickly cingulate, apex rounded acute. Mesonotum with distal margin faintly concave. Metanotum with distal margin shallowly biconcave.

Abdomen with seventh tergite large, transverse, scoop-like; lateral margins converging, distal margin very broadly arcuate obtuse-angulate. Supra-anal plate almost completely hidden under the enlarged seventh tergite, distal margin arcuate with a median angulate emargination. Cerci very short and conical, not surpassing the distal margin of the supra-anal plate, subdeplanate. Subgenital plate slightly asymmetrical, the free margin in general strongly arcuate, dextral section moderately concave; styles short, simple.

Femora with ventral margins unarmed except for a distal spine on ventro-cephalic margin of cephalic femora, and a rudiment of a similarly located spine on one of the caudal femora. Caudal tarsi with metatarsal pulvillus covering very slightly more than half the ventral surface of metatarsus. Arolia large.

General color shining pitch brown, obscurely delimited areas cephalo-laterad on pronotum dull zinc orange. Much of vicinity of antennal scrobes, genæ and most of mouth-parts, zinc orange to pale ochraceous-orange; eyes deep fuscous; antennæ zinc orange proximad, passing to cinnamon-brown distad. Limbs, including coxæ, cinnamon-rufous to hay's russet; tarsi pale ochraceous-orange. Cerci and styles pale ochraceous-orange, the former tipped with pitch brown.

Length of body, 18.2 mm.; length of pronotum, 6; greatest (caudal) width of pronotum, 8; length of tegmen, 2.9.

From the data now available it is evident the species is distributed over a considerable section of the Lesser Antilles. There can be no doubt but that the two West Indian species of this genus are of not very ancient South American origin.

Poroblatta nigra (Brunner)

P[araphæria] nigra Brunner, 1892, Proc. Zoöl. Soc. London, 1892, p. 206, Pl. xv, fig. 7. ♂, ♀; St. Vincent, West Indies.

The exact localities given for this species are: Lot 14 Estate and west slope of Soufrière volcano at an elevation of 1500 feet, under rotting fruit, in September.

PLATES I TO XXV

PLATE I

Fig. 1. *Cariblatta nebulicola*, new species. Ventral aspect of subgenital plate of male (type). Morces Gap, Jamaica. (Greatly enlarged.)

Fig. 2. *Cariblatta picturata*, new species. Pattern of pronotum. Male (type). Adjuntas, Porto Rico. (×10.)

Fig. 3. *Cariblatta picturata*, new species. Pattern of interocular region and face. Male (type). Adjuntas, Porto Rico. (Greatly enlarged.)

Fig. 4. *Cariblatta picturata*, new species. Ventral aspect of subgenital plate of male (type). Adjuntas, Porto Rico. (Greatly enlarged.)

Fig. 5. *Cariblatta picturata*, new species. Details of single (sinistral) style of subgenital plate of male (type). Adjuntas, Porto Rico. (Greatly enlarged.)

Fig. 6. *Cariblatta unguiculata*, new species. Details of single (sinistral) style of subgenital plate of male (type). San Francisco Mountains, Dominican Republic, Hispaniola. (Greatly enlarged.)

Fig. 7. *Cariblatta glochis*, new species. Ventral aspect of subgenital plate of male (type). Mangrove Cay, Bahamas. (Greatly enlarged.)

Fig. 8. *Cariblatta leucops*, new species. Ventral aspect of subgenital plate of male (type). Port-au-Prince, Haiti, Hispaniola. (Greatly enlarged.)

Fig. 9. *Cariblatta orestera*, new species. Pattern of pronotum. Male (type). Between Pleasant Hill and St. Helens Gap, Jamaica. (×7½.)

Fig. 10. *Cariblatta orestera*, new species. Pattern of interocular region and face. Male (type). Between Pleasant Hill and St. Helens Gap, Jamaica. (Greatly enlarged.)

Fig. 11. *Cariblatta orestera*, new species. Ventral aspect of subgenital plate of male (type). Between Pleasant Hill and St. Helens Gap, Jamaica. (Greatly enlarged.)

Fig. 12. *Cariblatta cryptobia*, new species. Pattern of interocular region and face. Male (type). Stony Hill, Jamaica. (Greatly enlarged.)

Fig. 13. *Cariblatta cryptobia*, new species. Pattern of pronotum. Male (type). Stony Hill, Jamaica. (×10.)

Fig. 14. *Cariblatta cryptobia*, new species. Ventral aspect of subgenital plate of male (type). Stony Hill, Jamaica. (Greatly enlarged.)

Fig. 15. *Cariblatta islacolonis*, new species. Pattern of pronotum. Male (type). San Lorenzo, Dominican Republic, Hispaniola. (×11.)

Fig. 16. *Cariblatta islacolonis*, new species. Pattern of interocular region and face. Male (type). San Lorenzo, Dominican Republic, Hispaniola. (Greatly enlarged.)

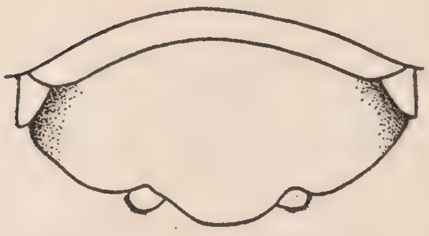
Fig. 17. *Cariblatta islacolonis*, new species. Ventral aspect of subgenital plate of male (type). San Lorenzo, Dominican Republic, Hispaniola. (Greatly enlarged.)

Fig. 18. *Cariblatta plagia*, new species. Ventral aspect of subgenital plate of male (type). Arecibo, Porto Rico. (Greatly enlarged.)

Fig. 19. *Cariblatta plagia*, new species. Pattern of pronotum. Male (paratype). Manati, Porto Rico. (×10½.)

Fig. 20. *Cariblatta plagia*, new species. Pattern of interocular region and face. Male (paratype). Manati, Porto Rico. (Greatly enlarged.)

Fig. 21. *Cariblatta stenophrys*, new species. Pattern of interocular region and face. Male (type). Mayaguez, Porto Rico. (Greatly enlarged.)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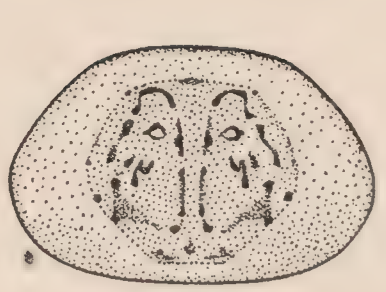
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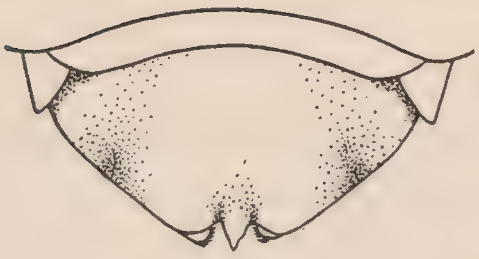
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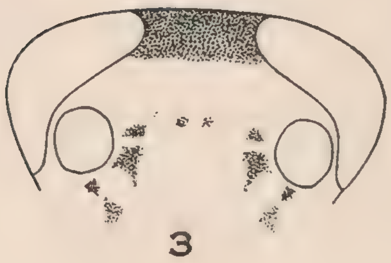
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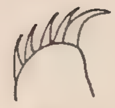
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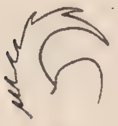
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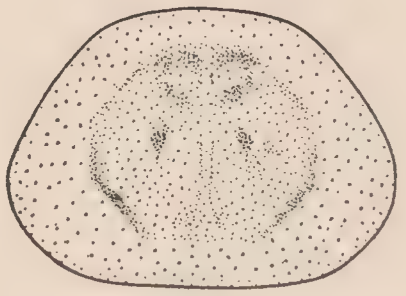
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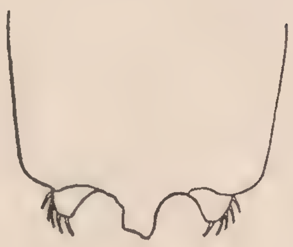
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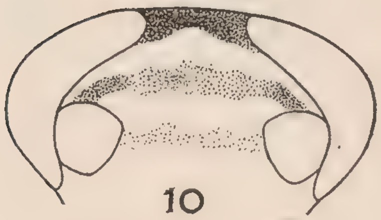
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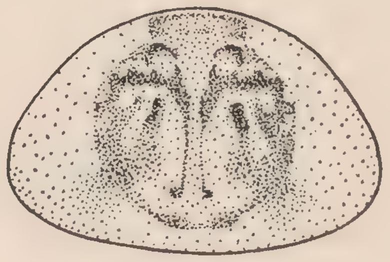
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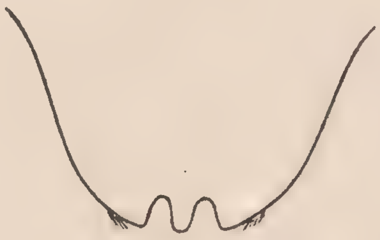
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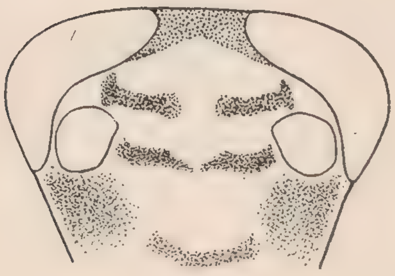
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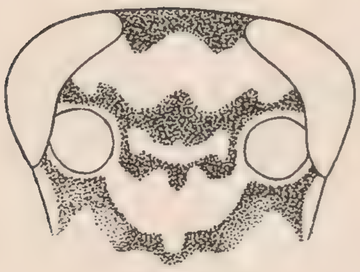
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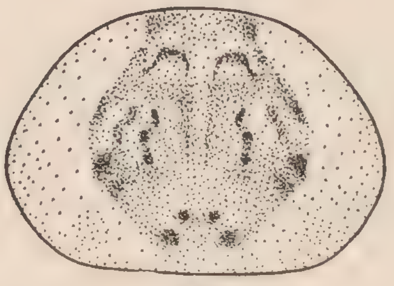
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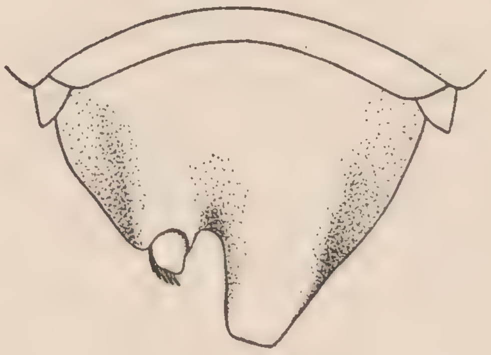
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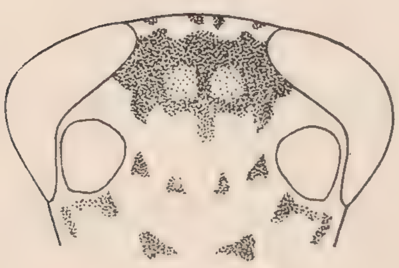
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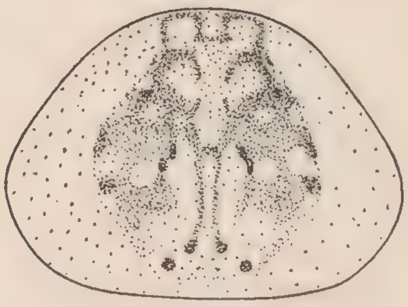
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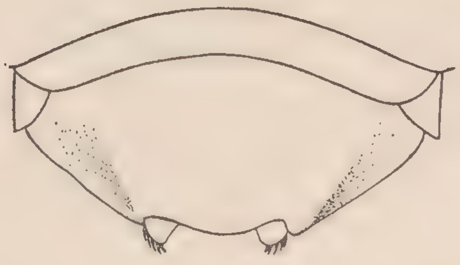
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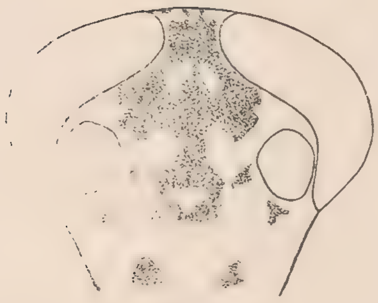
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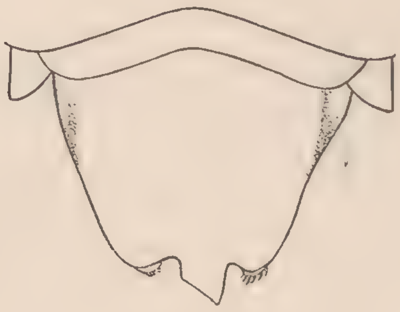
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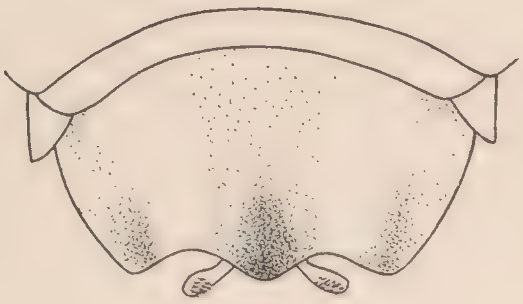
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PLATE II

Fig. 1. *Cariblatta stenophrys*, new species. Pattern of pronotum. Male (type). Mayaguez, Porto Rico. (×10½.)

Fig. 2. *Cariblatta stenophrys*, new species. Ventral aspect of subgenital plate of male (type). Mayaguez, Porto Rico. (Greatly enlarged.)

Fig. 3. *Cariblatta antiguensis* (Saussure and Zehntner). Pattern of interocular region and face. Male. Virgin Islands. (Greatly enlarged.)

Fig. 4. *Cariblatta antiguensis* (Saussure and Zehntner). Ventral aspect of subgenital plate of male. Virgin Islands. (Greatly enlarged.)

Fig. 5. *Cariblatta jamaicensis*, new species. Pattern of pronotum. Male (type). Balaclava, Jamaica. (×9½.)

Fig. 6. *Cariblatta jamaicensis*, new species. Pattern of interocular region and face. Male (type). Balaclava, Jamaica. (Greatly enlarged.)

Fig. 7. *Cariblatta jamaicensis*, new species. Ventral aspect of subgenital plate of male (type). Balaclava, Jamaica. (Greatly enlarged.)

Fig. 8. *Cariblatta jamaicensis*, new species. Distal aspect of distal margin of male (type), showing styles. Balaclava, Jamaica. (Greatly enlarged.)

Fig. 9. *Cariblatta insularis* (Walker). Ventral aspect of subgenital plate of female. Montego Bay, Jamaica. (Greatly enlarged.)

Fig. 10. *Cariblatta landalei*, new species. Pattern of pronotum. Male (type). Pleasant Hill, Jamaica. (×9.)

Fig. 11. *Cariblatta landalei*, new species. Pattern of interocular region and face. Male (type). Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 12. *Cariblatta landalei*, new species. Ventral aspect of subgenital plate of male (type). Pleasant Hill, Jamaica. (Greatly enlarged.)

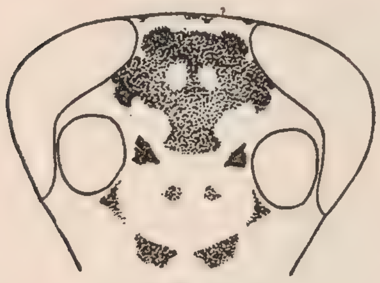
Fig. 13. *Cariblatta landalei*, new species. Details of median emargination of subgenital plate of male (type), as seen from ventral surface. Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 14. *Cariblatta landalei*, new species. Ventral aspect of subgenital plate of female (allotype). Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 15. *Neoblattella laodamia*, new species. Pattern of pronotum. Male (type). St. Vincent, West Indies. (×3.)

Fig. 16. *Neoblattella laodamia*, new species. Dorsal view of apex of abdomen of male (type). St. Vincent, West Indies. (×4.)

Fig. 17. *Neoblattella laodamia*, new species. Ventral aspect of subgenital plate of male (type). St. Vincent, West Indies. (Greatly enlarged.)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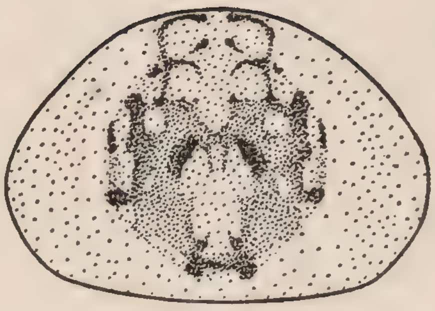
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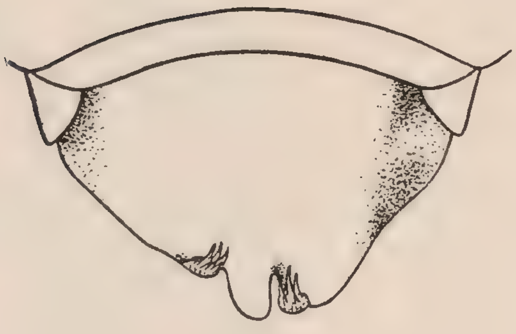
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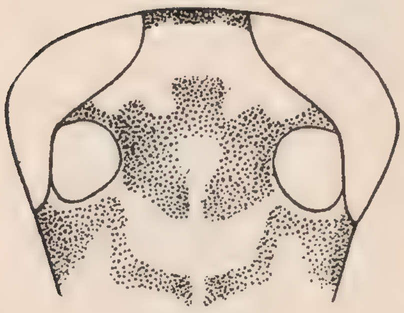
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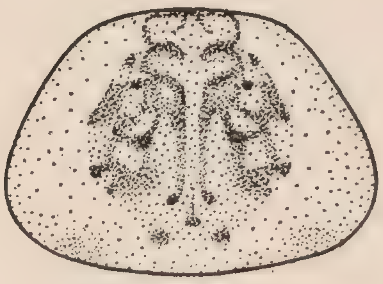
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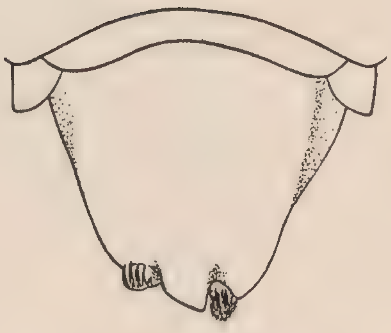
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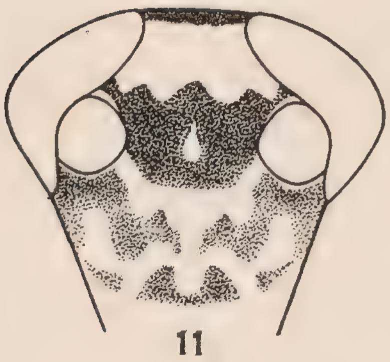
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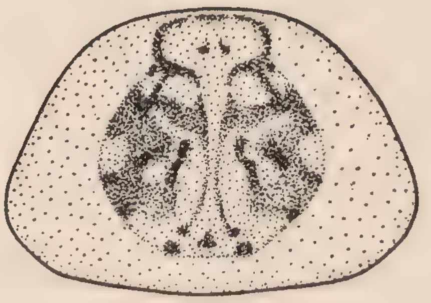
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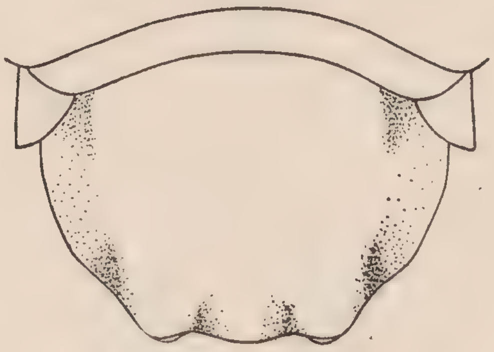
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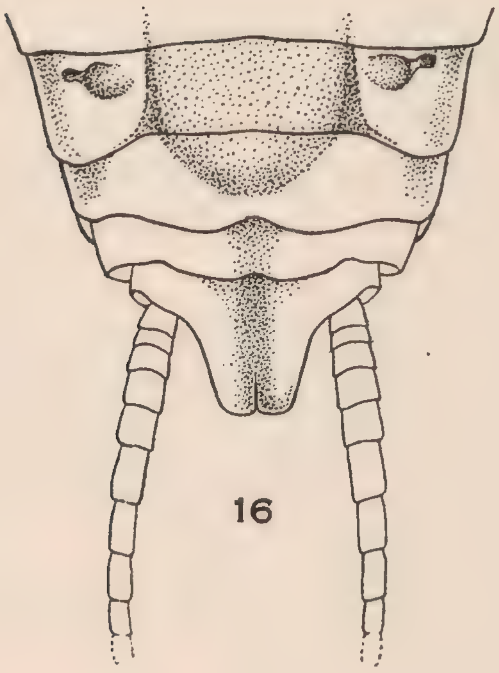
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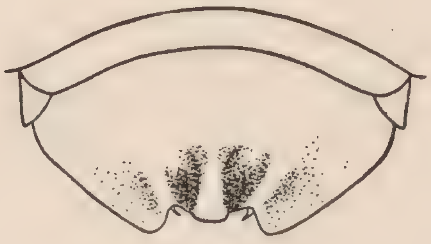
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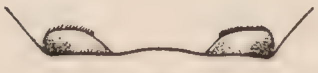
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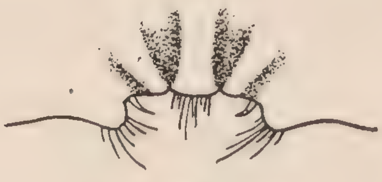
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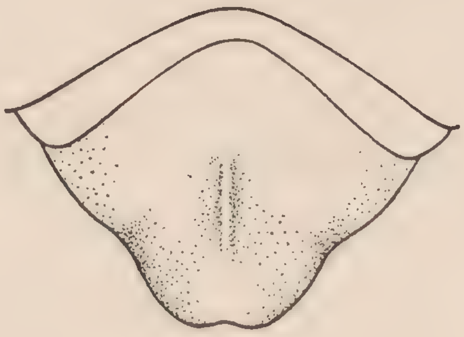
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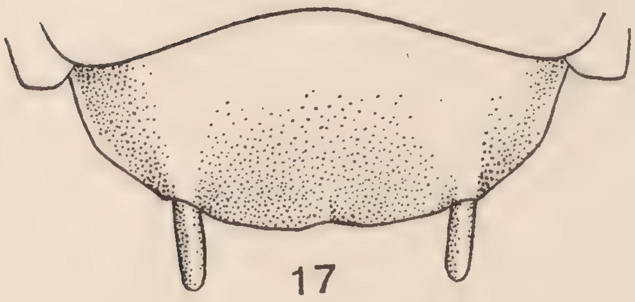
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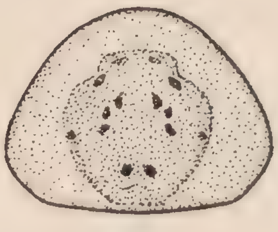
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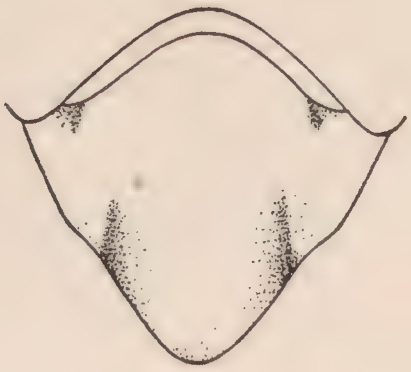
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PLATE III

Fig. 1. *Cariblattoides suave*, new genus and species. Dorsal view. Male (type). Aibonito, Porto Rico. (×5.)

Fig. 2. *Cariblattoides suave*, new genus and species. Palpus. Male (type). Aibonito, Porto Rico. (Greatly enlarged.)

Fig. 3. *Cariblattoides suave*, new genus and species. Cephalic aspect of cephalic femur. Male (type). Aibonito, Porto Rico. (Greatly enlarged.)

Fig. 4. *Cariblattoides suave*, new genus and species. Ventral aspect of subgenital plate of male (type). Aibonito, Porto Rico. (Greatly enlarged.)

Fig. 5. *Cariblattoides suave*, new genus and species. Pattern of pronotum. Female (allotype). Aibonito, Porto Rico. (×9.)

Fig. 6. *Cariblattoides instigator*, new genus and species. Pattern of pronotum. Male (type). Guantanamo, Cuba. (×7.)

Fig. 7. *Cariblattoides instigator*, new genus and species. Palpus. Male (type). Guantanamo, Cuba. (Greatly enlarged.)

Fig. 8. *Cariblattoides instigator*, new genus and species. Cephalic aspect of cephalic femur. Male (type). Guantanamo, Cuba. (Greatly enlarged.)

Fig. 9. *Cariblattoides instigator*, new genus and species. Ventral aspect of subgenital plate of male (type). Guantanamo, Cuba. (Greatly enlarged.)

Fig. 10. *Neoblattella carcinus*, new species. Dorsal aspect of supra-anal plate of female (allotype). San Francisco Mountains, Dominican Republic, Hispaniola. (Greatly enlarged.)

Fig. 11. *Neoblattella carcinus*, new species. Ventral aspect of subgenital plate of female (allotype). San Francisco Mountains Dominican Republic, Hispaniola. (Greatly enlarged.)

Fig. 12. *Neoblattella carcinus*, new species. Dorsal aspect of supra-anal plate of male (type). Dominican Republic, Hispaniola. (Greatly enlarged.)

Fig. 13. *Neoblattella carcinus*, new species. Ventral aspect of subgenital plate of male (type). Dominican Republic, Hispaniola. (Greatly enlarged.)

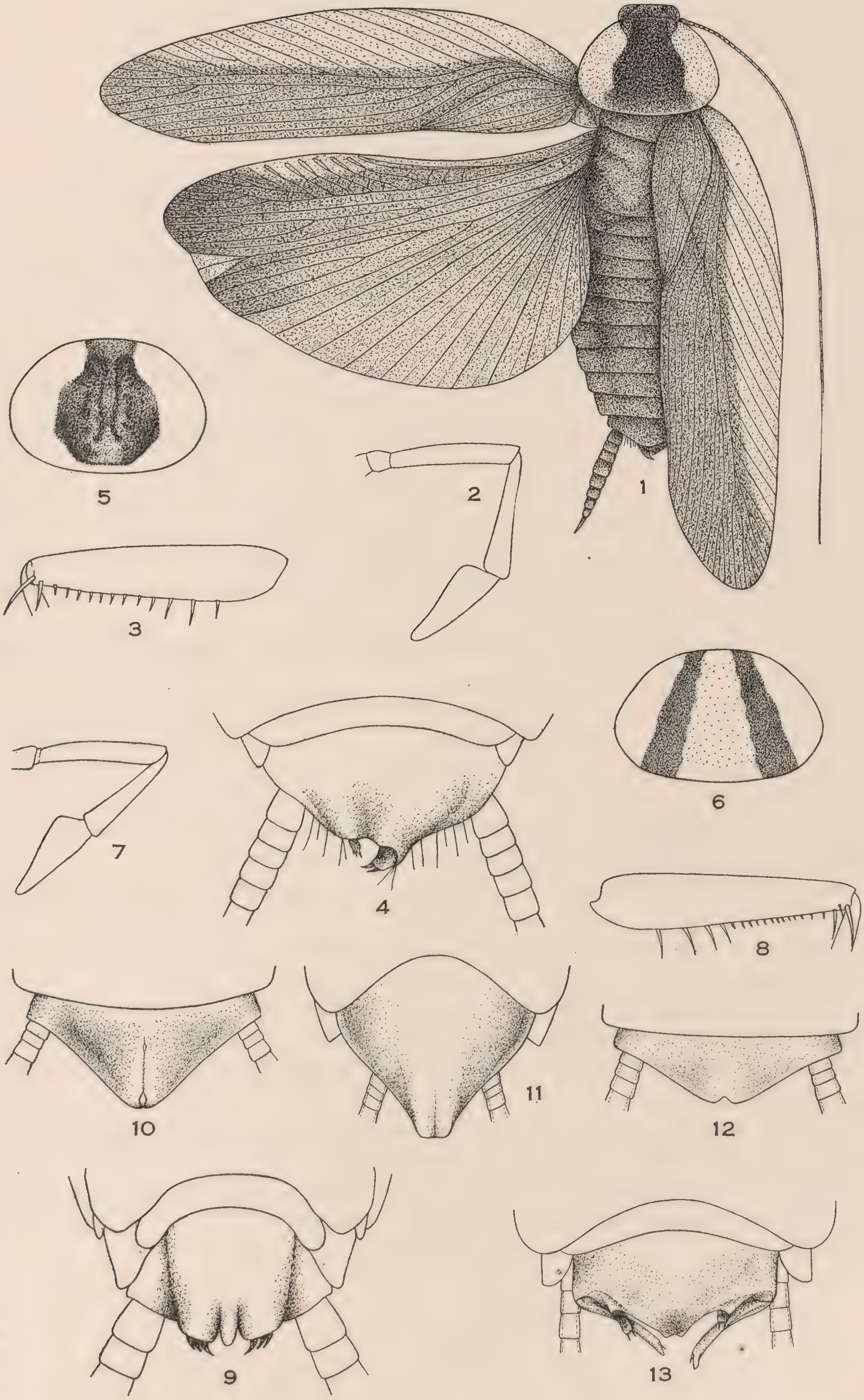
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PLATE IV

Fig. 1. *Neoblattella eurydice*, new species. Pattern of pronotum. Male (type). Between Pleasant Hill and St. Helens Gap, Jamaica. (×6¼.)

Fig. 2. *Neoblattella eurydice*, new species. Pattern of interocular region and upper portion of face. Male (type). Between Pleasant Hill and St. Helens Gap, Jamaica. (Greatly enlarged.)

Fig. 3. *Neoblattella eurydice*, new species. Ventral aspect of subgenital plate of male (type). Between Pleasant Hill and St. Helens Gap, Jamaica. (Greatly enlarged.)

Fig. 4. *Neoblattella eurydice*, new species. Tegmen. Male (type). Between Pleasant Hill and St. Helens Gap, Jamaica. (×4.)

Fig. 5. *Neoblattella proserpina*, new species. Pattern of pronotum. Male (type). Between Pleasant Hill and St. Helens Gap, Jamaica. (×5.)

Fig. 6. *Neoblattella proserpina*, new species. Ventral aspect of subgenital plate of male (type). Between Pleasant Hill and St. Helens Gap, Jamaica. (Greatly enlarged.)

Fig. 7. *Neoblattella detersa* (Walker). Ventral aspect of subgenital plate of male. Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 8. *Neoblattella celeripes*, new species. Ventral aspect of subgenital plate of male (type). Jamaica. (Greatly enlarged.)

Fig. 9. *Neoblattella celeripes*, new species. Lateral aspect of median production of subgenital plate of male (type). Jamaica. (Greatly enlarged.)

Fig. 10. *Neoblattella tridens*, new species. Pattern of interocular region and upper portion of face. Male (type). Jamaica. (Greatly enlarged.)

Fig. 11. *Neoblattella tridens*, new species. Ventral aspect of subgenital plate of male (type). Jamaica. (Greatly enlarged.)

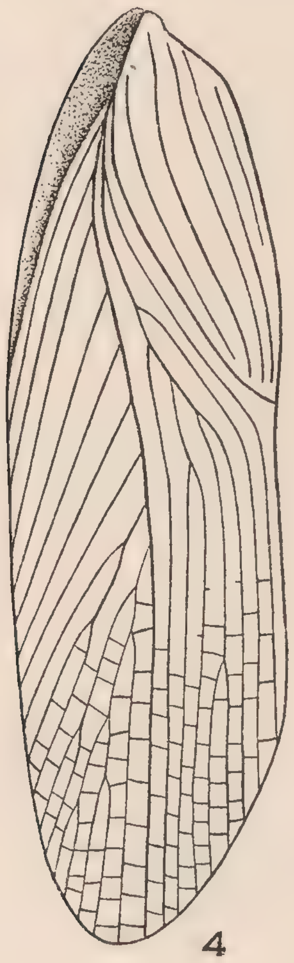
Fig. 12. *Neoblattella semota*, new species. Pattern of pronotum. Male (type). Pleasant Hill, Jamaica. (×6½.)

Fig. 13. *Neoblattella semota*, new species. Pattern of interocular region and upper portion of face. Male (type). Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 14. *Neoblattella semota*, new species. Palpus. Male (type). Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 15. *Neoblattella semota*, new species. Ventral aspect of subgenital plate of male (type). Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 16. *Neoblattella semota*, new species. Dorsal aspect of supra-anal plate of male (type). Pleasant Hill, Jamaica. (Greatly enlarged.)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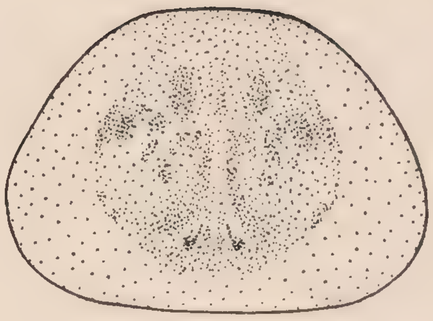
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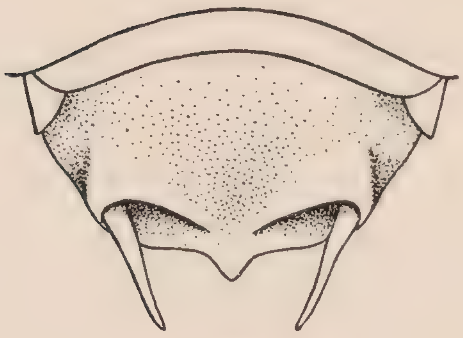
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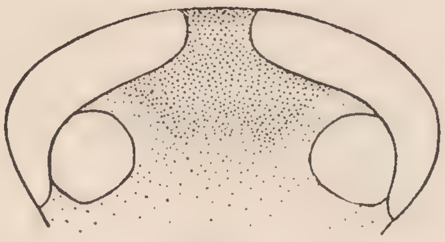
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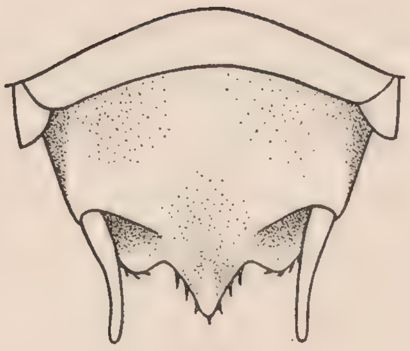
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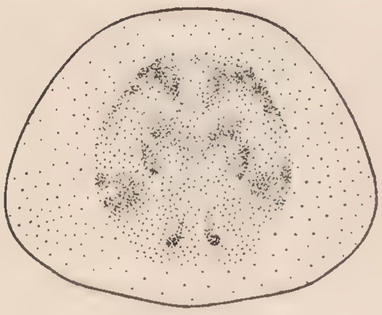
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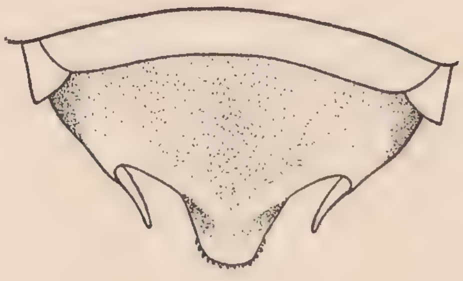
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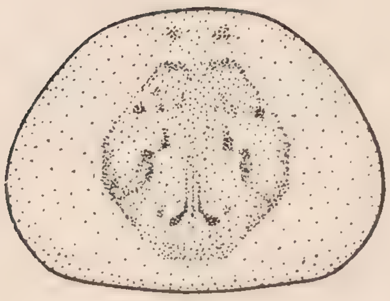
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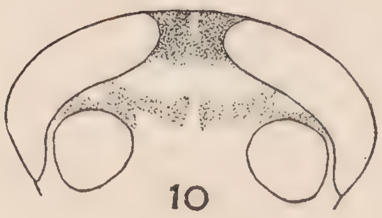
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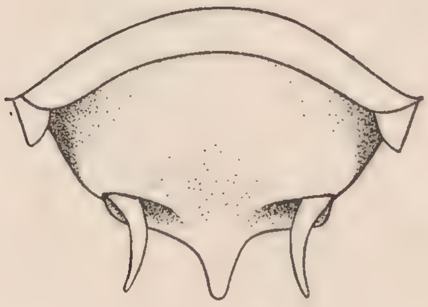
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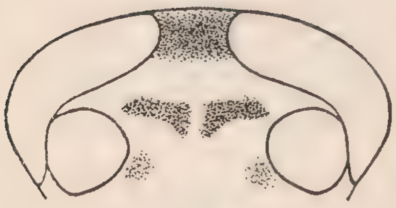
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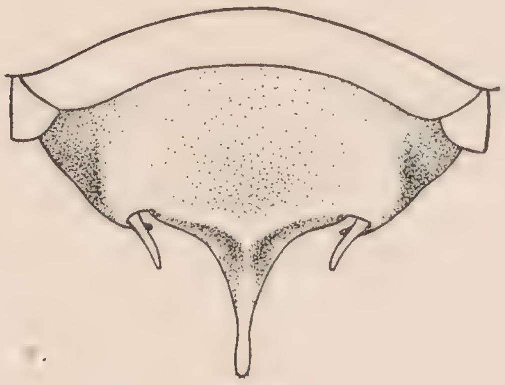
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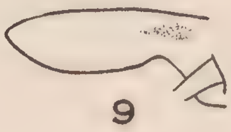
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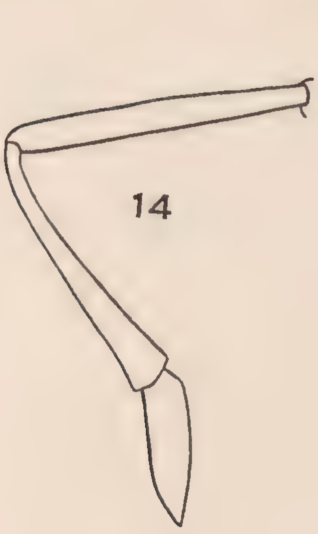
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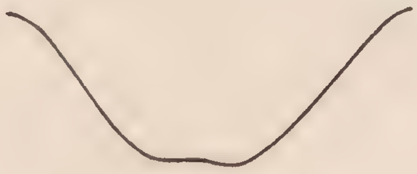
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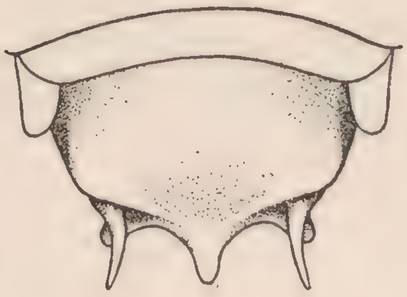
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PLATE V

Fig. 1. *Neoblattella vatia*, new species. Dorsal aspect of supra-anal plate of male (type). Cuba. (Greatly enlarged.)

Fig. 2. *Neoblattella vatia*, new species. Outline of caudal aspect of anal chamber of male (type). Cuba. (Greatly enlarged.)

Fig. 3. *Neoblattella vatia*, new species. Ventral aspect of subgenital plate of male (type). Cuba. (Greatly enlarged.)

Fig. 4. *Neoblattella vatia*, new species. Palpus, Female (allotype). Baños de San Vincente, Cuba. (Greatly enlarged.)

Fig. 5. *Neoblattella vatia*, new species. Dorsal aspect of supra-anal plate of female (allotype). Baños de San Vincente, Cuba. (Greatly enlarged.)

Fig. 6. *Neoblattella vatia*, new species. Ventral aspect of subgenital plate of female (allotype). Baños de San Vincente, Cuba. (Greatly enlarged.)

Fig. 7. *Neoblattella detersa* (Walker). Ventral aspect of subgenital plate of male. Stony Hill, Jamaica. (Greatly enlarged.)

Fig. 8. *Neoblattella detersa* (Walker). Lateral view of subgenital plate of male. Stony Hill, Jamaica. (Greatly enlarged.)

Fig. 9. *Neoblattella detersa* (Walker). Dorsal aspect of supra-anal plate of female. Kingston, Jamaica. (Greatly enlarged.)

Fig. 10. *Neoblattella detersa* (Walker). Ventral aspect of subgenital plate of female. Kingston, Jamaica. (Greatly enlarged.)

Fig. 11. *Neoblattella borinquenensis*, new species. Ventral aspect of subgenital plate of male (type). El Yunque, Porto Rico. (Greatly enlarged.)

Fig. 12. *Neoblattella borinquenensis*, new species. Dorsal aspect of supra-anal plate of female (allotype). Manati, Porto Rico. (Greatly enlarged.)

Fig. 13. *Neoblattella borinquenensis*, new species. Ventral aspect of subgenital plate of female (allotype). Manati, Porto Rico. (Greatly enlarged.)

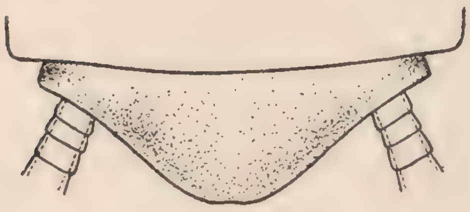
Fig. 14. *Neoblattella vomer*, new species. Dorsal aspect of supra-anal plate of male (type). Mayaguez, Porto Rico. (Greatly enlarged.)

Fig. 15. *Neoblattella vomer*, new species. Ventral aspect of subgenital plate of male (type). Mayaguez, Porto Rico. (Greatly enlarged.)

Fig. 16. *Neoblattella vomer*, new species. Lateral aspect of subgenital plate of male (type). Mayaguez, Porto Rico. (Greatly enlarged.)

Fig. 17. *Neoblattella vomer*, new species. Dorsal aspect of supra-anal plate of female (allotype). Adjuntas, Porto Rico. (Greatly enlarged.)

Fig. 18. *Neoblattella vomer*, new species. Ventral aspect of subgenital plate of female (allotype). Adjuntas, Porto Rico. (Greatly enlarged.)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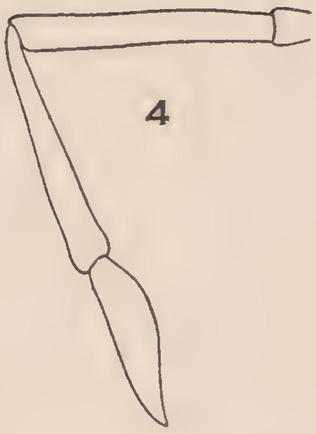
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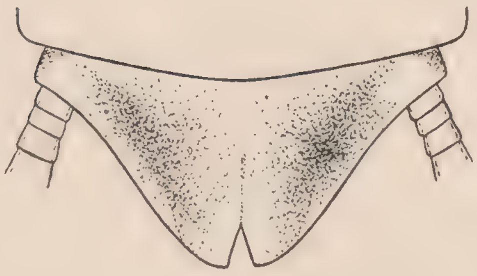
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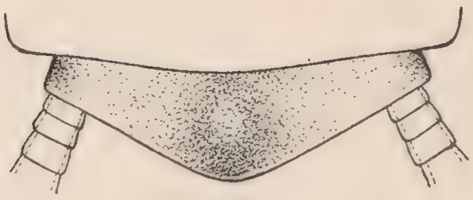
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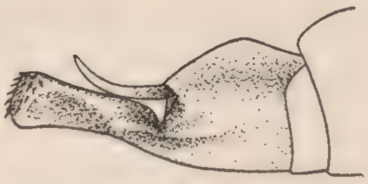
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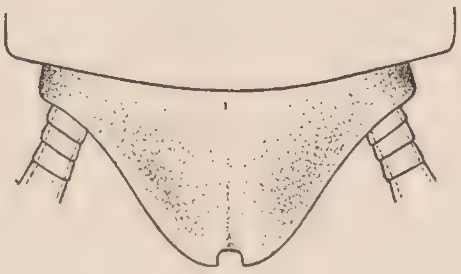
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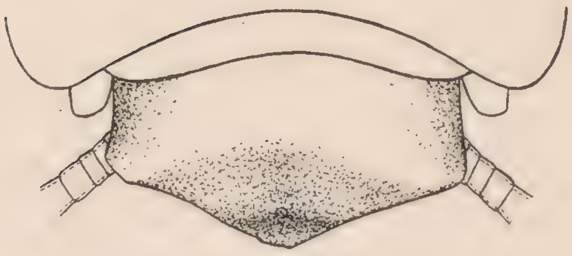
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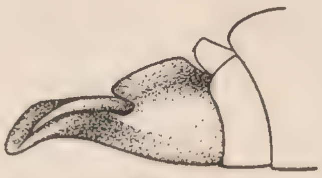
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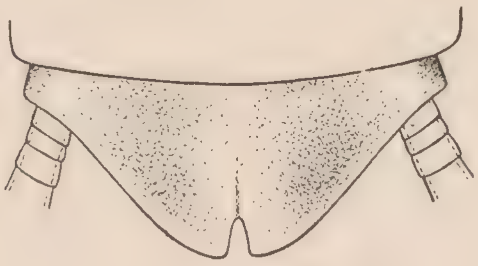
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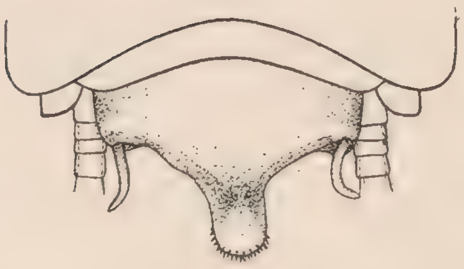
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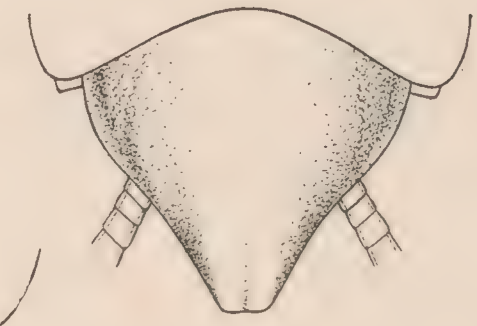
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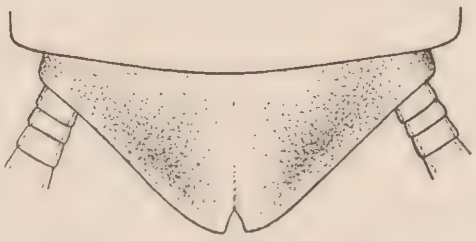
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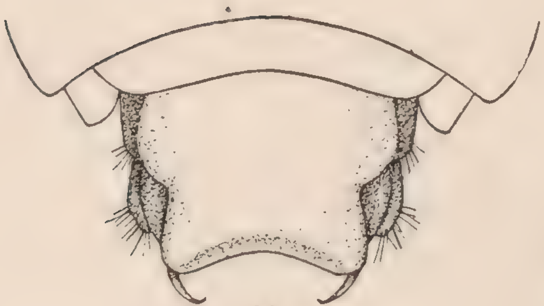
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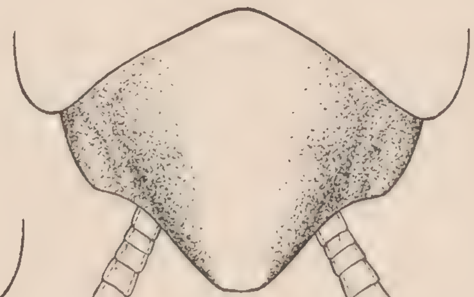
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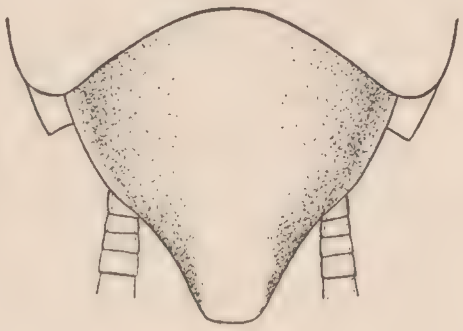
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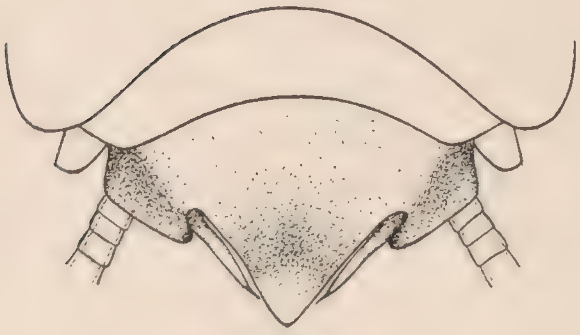
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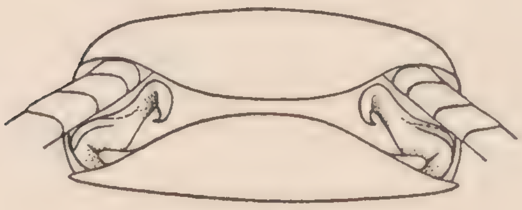
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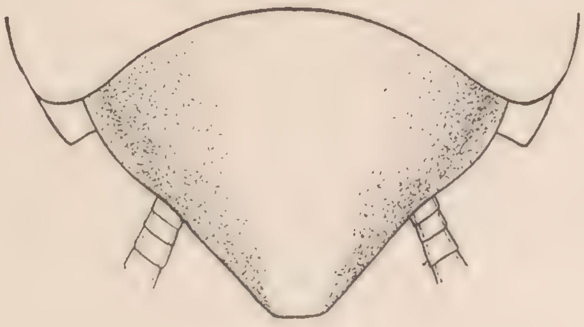
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PLATE VI

Fig. 1. *Neoblattella infausta*, new species. Outline of tegmen. Female (paratype). Port-au-Prince, Haiti. (×4.)

Fig. 2. *Neoblattella infausta*, new species. Pattern of interocular region and upper portion of face. Female (paratype). Port-au-Prince, Haiti. (Greatly enlarged.)

Fig. 3. *Neoblattella grossbecki*, new species. Outline of tegmen. Female (type). Cinchona, Jamaica. (×4.)

Fig. 4. *Neoblattella grossbecki*, new species. Pattern of interocular region and upper portion of face. Female (type). Cinchona, Jamaica. (Greatly enlarged.)

Fig. 5. *Neoblattella lucubrans*, new species. Outline of tegmen. Male (type). Pleasant Hill, Jamaica. (×4.)

Fig. 6. *Neoblattella lucubrans*, new species. Pattern of interocular region and upper portion of face. Male (type). Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 7. *Neoblattella lucubrans*, new species. Pattern of pronotum. Male (type). Pleasant Hill, Jamaica. (×6¼.)

Fig. 8. *Neoblattella lucubrans*, new species. Ventral aspect of subgenital plate of male (type). Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 9. *Neoblattella dryas*, new species. Outline of tegmen. Male (type). Morces Gap, Jamaica. (×4.)

Fig. 10. *Neoblattella dryas*, new species. Pattern of pronotum. Male (type). Morces Gap, Jamaica. (×6¼.)

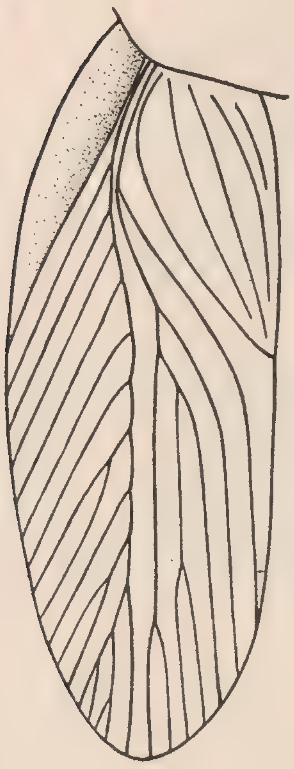
Fig. 11. *Neoblattella dryas*, new species. Pattern of interocular region and upper portion of face. Male (type). Morces Gap, Jamaica. (Greatly enlarged.)

Fig. 12. *Neoblattella dryas*, new species. Ventral aspect of subgenital plate of male (type). Morces Gap, Jamaica. (Greatly enlarged.)

Fig. 13. *Pseudosymploce schistopyga*, new genus and species. Dorsal surface of supra-anal plate of male (type). Port Antonio, Jamaica. (Greatly enlarged.)

Fig. 14. *Pseudosymploce schistopyga*, new genus and species. Ventral aspect of subgenital plate of male (type). Port Antonio, Jamaica. (Greatly enlarged.)

Fig. 15. *Pseudosymploce schistopyga*, new genus and species. Dorsal surface of supra-anal plate of female (allotype). Pleasant Hill, Jamaica. (Greatly enlarged.)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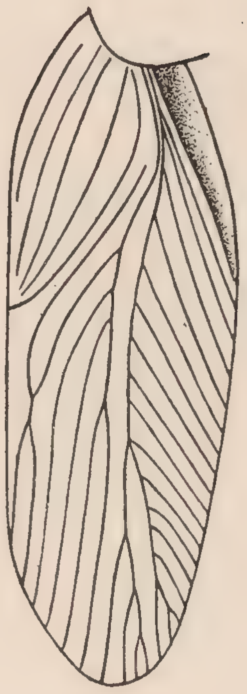
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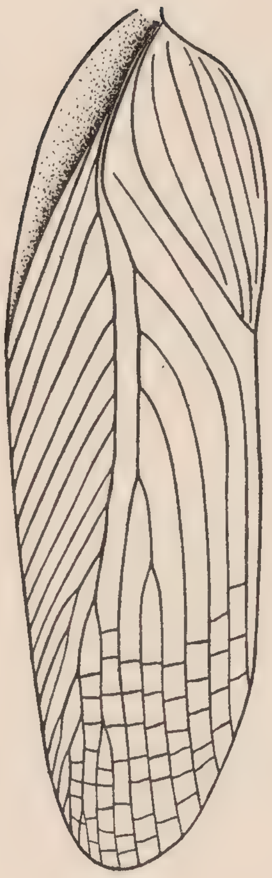
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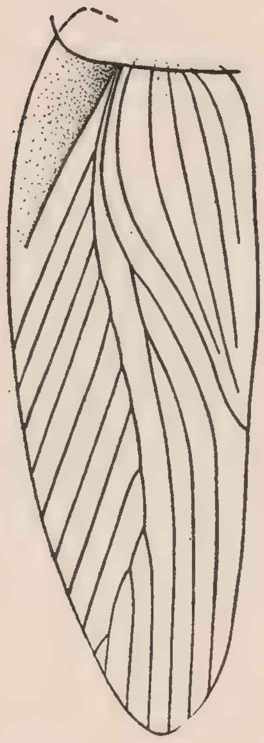
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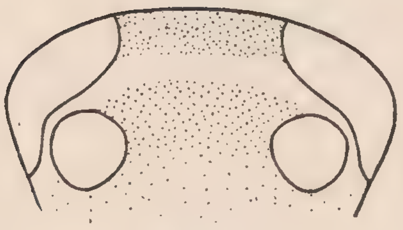
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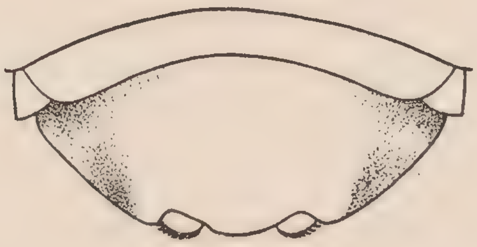
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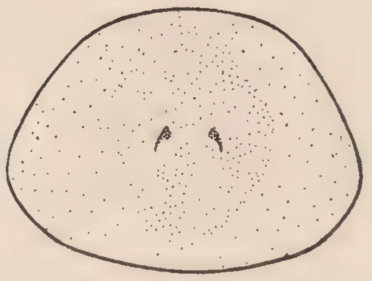
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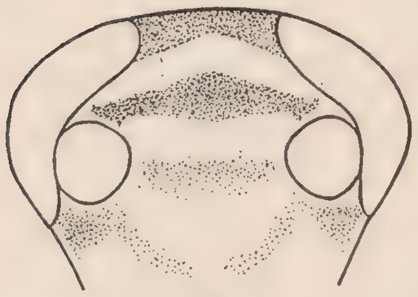
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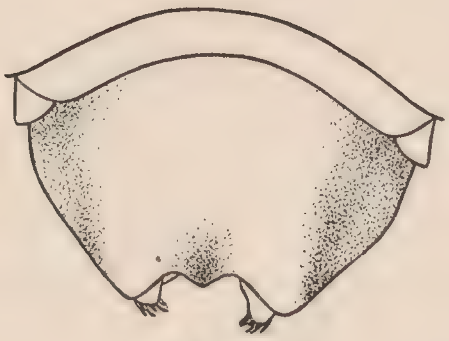
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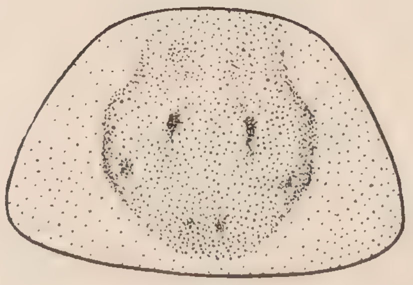
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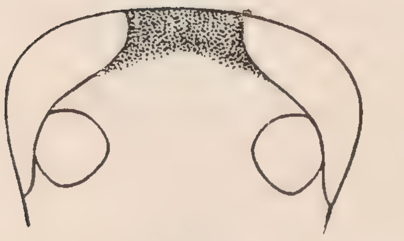
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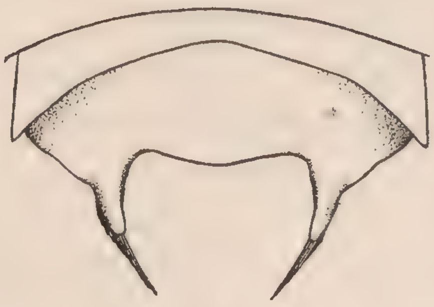
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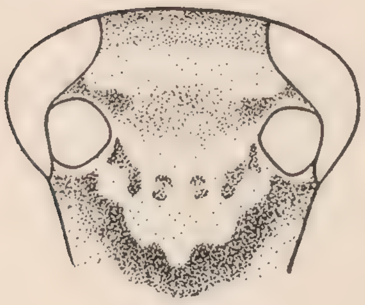
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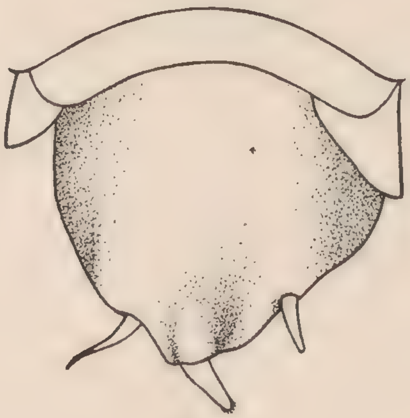
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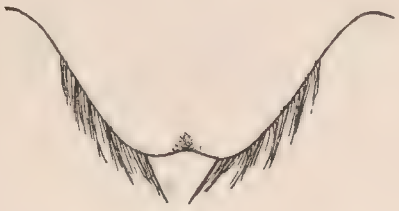
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PLATE VII

Fig. 1. *Neoblattella grossbecki*, new species. Pattern of pronotum. Female (type). Cinchona, Jamaica. (×7.)

Fig. 2. *Neoblattella grossbecki*, new species. Pattern of interocular region and face. Female (type). Cinchona, Jamaica. (Greatly enlarged.)

Fig. 3. *Neoblattella grossbecki*, new species. Palpus. Female (type). Cinchona, Jamaica. (Greatly enlarged.)

Fig. 4. *Neoblattella grossbecki*, new species. Cephalic aspect of cephalic femur. Female (type). Cinchona, Jamaica. (Greatly enlarged.)

Fig. 5. *Neoblattella infausta*, new species. Pattern of pronotum. Female (type). Haiti. (×6½.)

Fig. 6. *Neoblattella infausta*, new species. Cephalic aspect of cephalic femur. Female (type). Haiti. (Greatly enlarged.)

Fig. 7. *Nymphodromia miranda*, new genus and species. Pattern of pronotum. Male (type). San Francisco Mountains, Dominican Republic. (×7½.)

Fig. 8. *Nymphodromia miranda*, new genus and species. Tegmen. Male (type). San Francisco Mountains, Dominican Republic. (×5½.)

Fig. 9. *Nymphodromia miranda*, new genus and species. Palpus. Male (type). San Francisco Mountains, Dominican Republic. (Greatly enlarged.)

Fig. 10. *Nymphodromia miranda*, new genus and species. Cephalic aspect of cephalic femur. Male (type). San Francisco Mountains, Dominican Republic. (Greatly enlarged.)

Fig. 11. *Nymphodromia miranda*, new genus and species. Dorsal aspect of supra-anal plate of male (type). San Francisco Mountains, Dominican Republic. (Greatly enlarged.)

Fig. 12. *Nymphodromia miranda*, new genus and species. Ventral aspect of subgenital plate of male (type). San Francisco Mountains, Dominican Republic. (Greatly enlarged.)

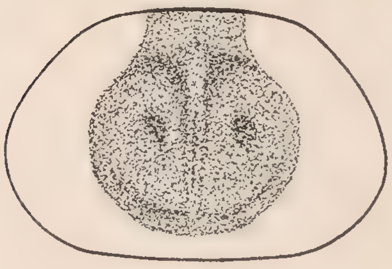
Fig. 13. *Nymphodromia miranda*, new genus and species. Ventral aspect of subgenital plate of female (allotype). San Francisco Mountains, Dominican Republic. (Greatly enlarged.)

Fig. 14. *Pseudosymploce elongata* (Beauvois). Pronotum. Male. San Francisco Mountains, Dominican Republic. (×5½.)

Fig. 15. *Pseudosymploce elongata* (Beauvois). Dorsal aspect of supra-anal plate of male. San Francisco Mountains, Dominican Republic. (Greatly enlarged.)

Fig. 16. *Pseudosymploce elongata* (Beauvois). Caudal aspect of anal orifice of male. San Francisco Mountains, Dominican Republic. (Greatly enlarged.)

Fig. 17. *Pseudosymploce elongata* (Beauvois). Ventral aspect of subgenital plate of male. San Francisco Mountains, Dominican Republic. (Greatly enlarged.)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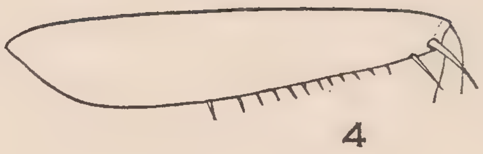
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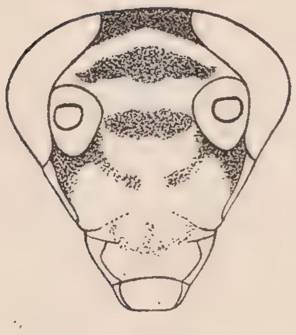
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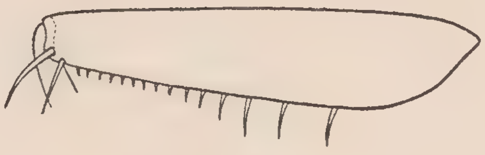
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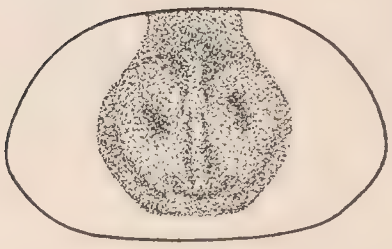
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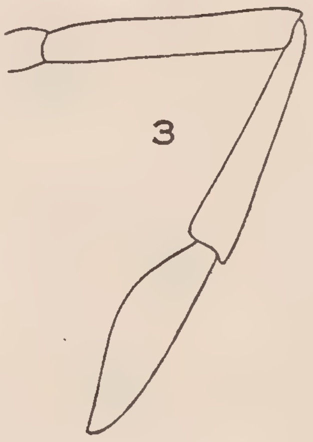
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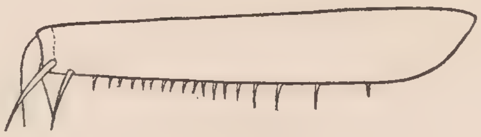
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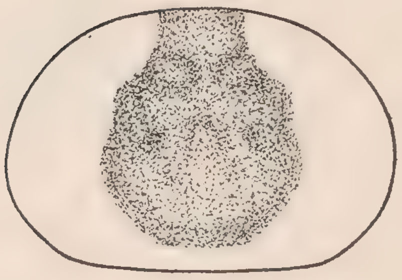
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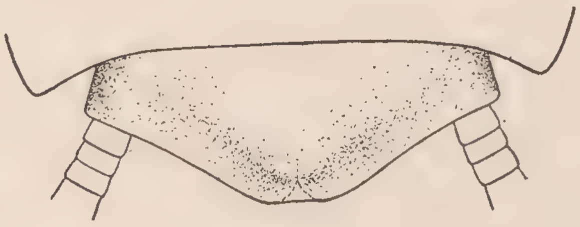
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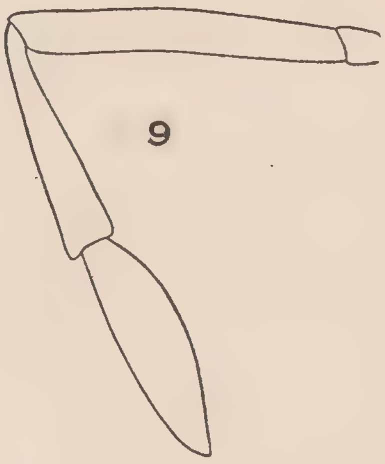
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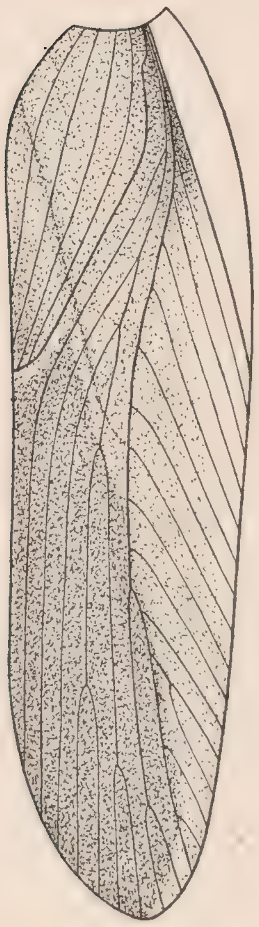
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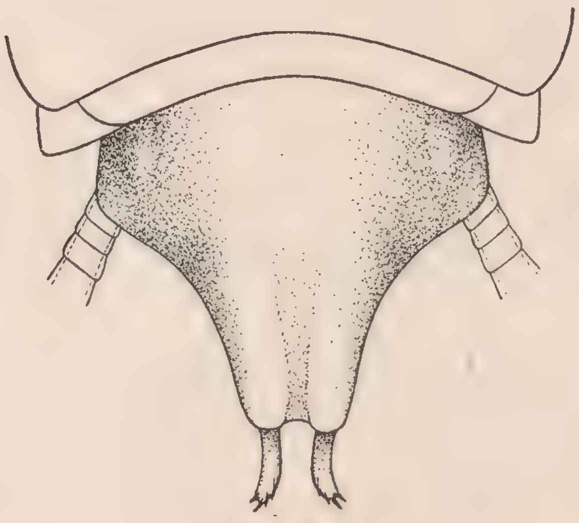
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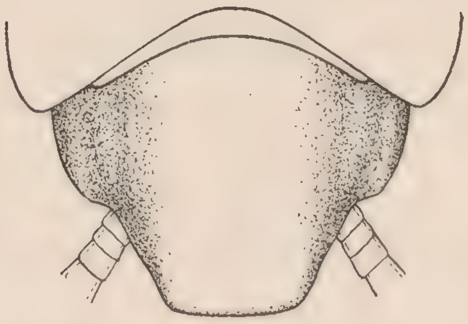
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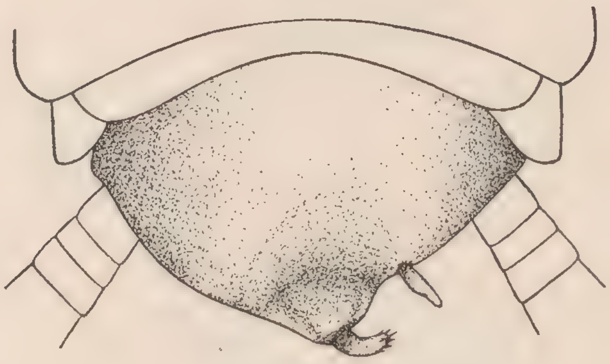
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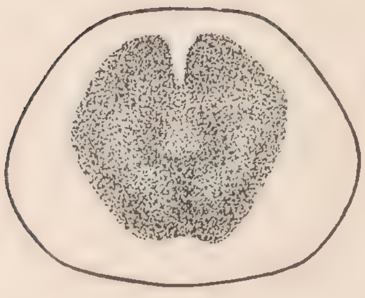
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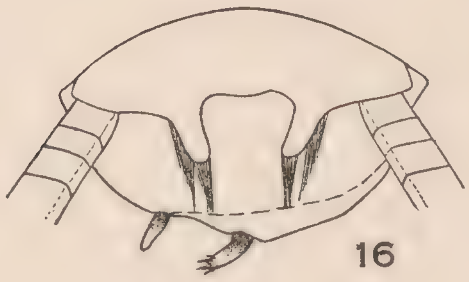
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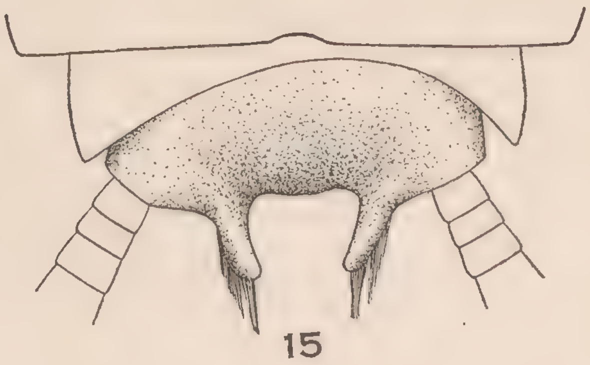
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PLATE VIII

Fig. 1. *Ischnoptera podoces*, new species. Pattern of interocular region and face. Male (type). Morces Gap, Jamaica. (Greatly enlarged.)

Fig. 2. *Ischnoptera podoces*, new species. Pronotum. Male (type). Morces Gap, Jamaica. (×6½.)

Fig. 3. *Ischnoptera podoces*, new species. Ventral aspect of subgenital plate of male (type). Morces Gap, Jamaica. (Greatly enlarged.)

Fig. 4. *Ischnoptera podoces*, new species. Dorsal aspect of supra-anal plate of male (type). (Partially restored.) Morces Gap, Jamaica. (Greatly enlarged.)

Fig. 5. *Ischnoptera podoces*, new species. Caudal aspect of supra-anal plate of male (type), showing bulbous ridges on ventral surface. Morces Gap, Jamaica. (Greatly enlarged.)

Fig. 6. *Ischnoptera oreochares*, new species. Pattern of interocular region and face. Male (type). Pleasant Hill, Jamaica. (Greatly enlarged.)

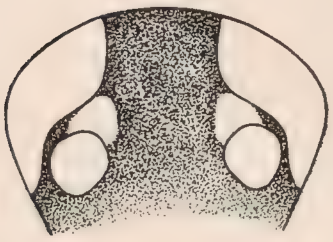
Fig. 7. *Ischnoptera oreochares*, new species. Wing. Male (type). Pleasant Hill, Jamaica. (×3.)

Fig. 8. *Ischnoptera oreochares*, new species. Dorsal aspect of apex of abdomen of male (type). (Supra-anal plate partially restored.) Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 9. *Ischnoptera oreochares*, new species. Ventral aspect of subgenital plate of male (type). Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 10. *Ischnoptera oreochares*, new species. Caudal aspect of anal orifice of male (type), showing concealed genitalia. Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 11. *Ischnoptera oreochares*, new species. Dorsal aspect of apex of abdomen of female (allotype). Cinchona, Jamaica. (Greatly enlarged.)



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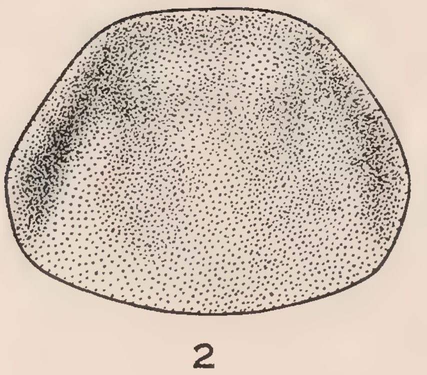

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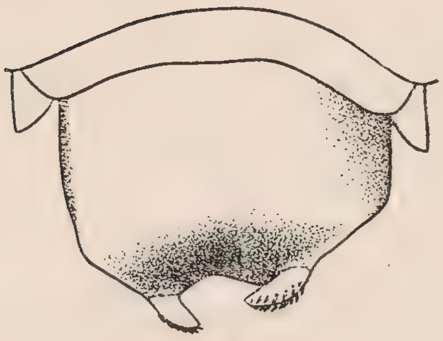

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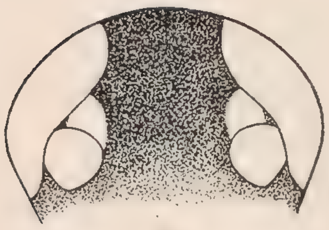

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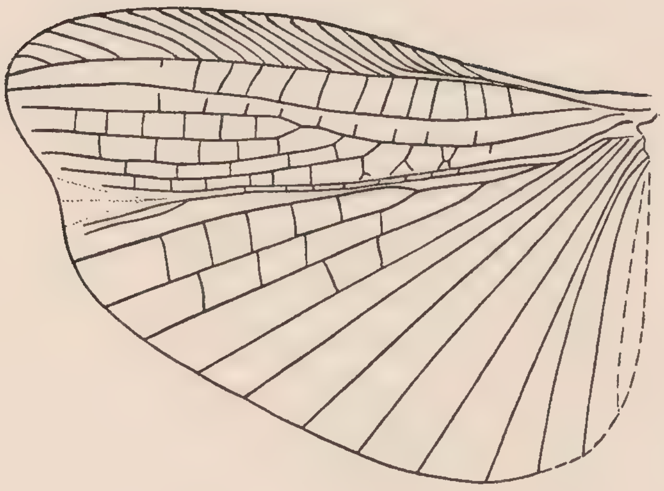

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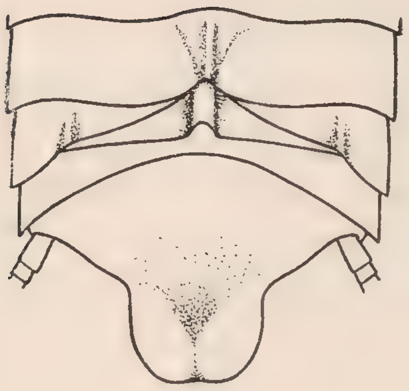

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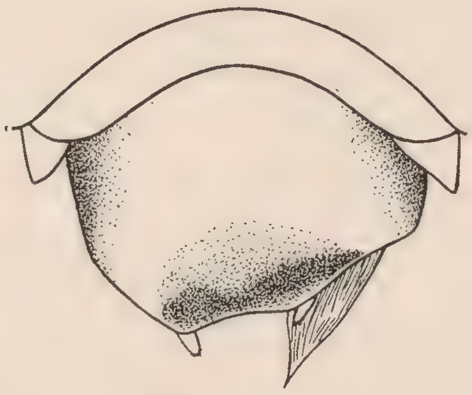

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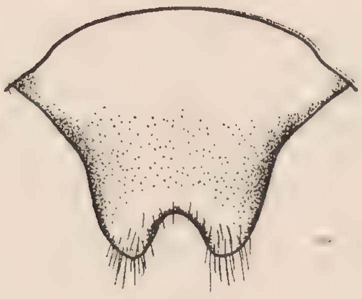

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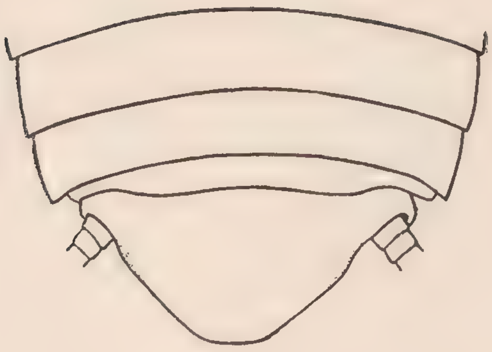

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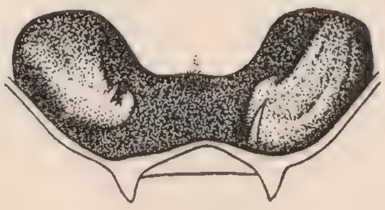

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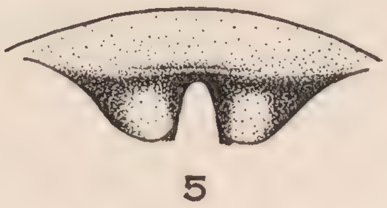

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PLATE IX

Fig. 1. *Pseudosymploce elongata* (Beauvois). Palpus. Male. San Francisco Mountains, Dominican Republic. (Greatly enlarged.)

Fig. 2. *Pseudosymploce elongata* (Beauvois). Cephalic aspect of cephalic femur. Male. San Francisco Mountains, Dominican Republic. (Greatly enlarged.)

Fig. 3. *Pseudosymploce elongata* (Beauvois). Dorsal aspect of supra-anal plate of female. San Lorenzo, Dominican Republic. (Greatly enlarged.)

Fig. 4. *Pseudosymploce elongata* (Beauvois). Wing. Female. San Lorenzo, Dominican Republic. (×4.)

Fig. 5. *Ischnoptera ligula*, new species. Dorsal aspect of supra-anal plate of male (type). Havana, Cuba. (Greatly enlarged.)

Fig. 6. *Ischnoptera ligula*, new species. Caudal aspect of apex of abdomen of male (type). Havana, Cuba. (Greatly enlarged.)

Fig. 7. *Ischnoptera ligula*, new species. Ventral aspect of subgenital plate of male (type). Havana, Cuba. (Greatly enlarged.)

Fig. 8. *Nelipophygus ramsdeni*, new genus and species. Dorsal outline of male (type). Rio Seco, San Carlos Estate, near Guantanamo, Cuba. (×2½.)

Fig. 9. *Nelipophygus ramsdeni*, new genus and species. Cephalic aspect of head. Male (type). Rio Seco, San Carlos Estate, near Guantanamo, Cuba. (×5.)

Fig. 10. *Nelipophygus ramsdeni*, new genus and species. Palpus. Male (type). Rio Seco, San Carlos Estate, near Guantanamo, Cuba. (Greatly enlarged.)

Fig. 11. *Nelipophygus ramsdeni*, new genus and species. Cephalic aspect of cephalic femur. Male (type). Rio Seco, San Carlos Estate, near Guantanamo, Cuba. (Greatly enlarged.)

Fig. 12. *Nelipophygus ramsdeni*, new genus and species. Apex of tarsus. Male (type). Rio Seco, San Carlos Estate, near Guantanamo, Cuba. (Greatly enlarged.)

Fig. 13. *Nelipophygus ramsdeni*, new genus and species. Caudal limb. Female (allotype). Monte Libano, near Guantanamo, Cuba. (×5.)

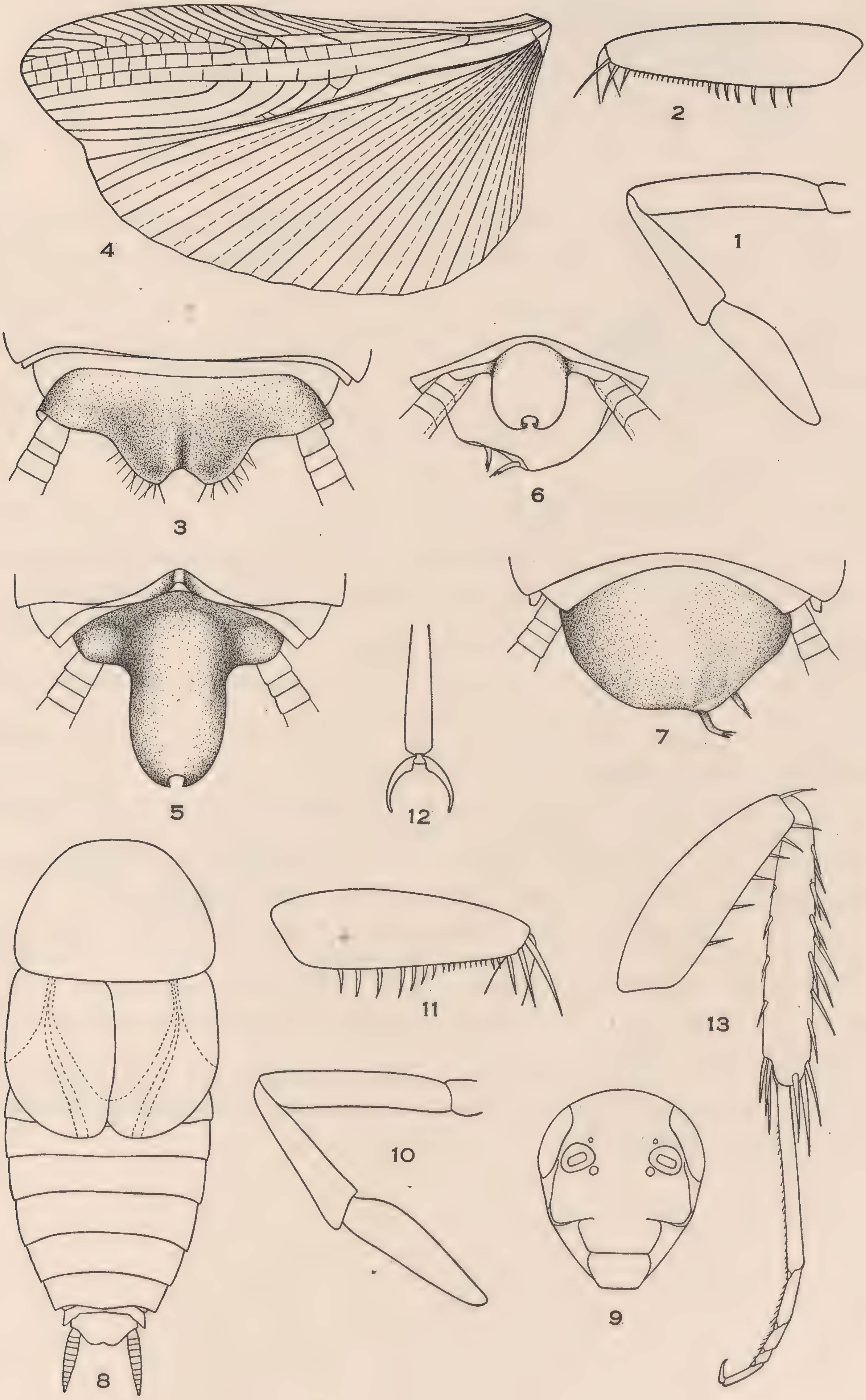


PLATE X

Fig. 1. *Nelipophygus ramsdeni*, new genus and species. Dorsal aspect of supra-anal plate of male (type). Rio Seco, San Carlos Estate, near Guantanamo, Cuba. (Greatly enlarged.)

Fig. 2. *Nelipophygus ramsdeni*, new genus and species. Ventral aspect of subgenital plate of male (type). Rio Seco, San Carlos Estate, near Guantanamo, Cuba. (Greatly enlarged.)

Fig. 3. *Nelipophygus ramsdeni*, new genus and species. Ventral aspect of subgenital plate of female (allotype). Monte Libano, near Guantanamo, Cuba. (Greatly enlarged.)

Fig. 4. *Symploce cristata*, new species. Dorsal aspect of apex of abdomen of male (type). Port-au-Prince, Haiti. (Greatly enlarged.)

Fig. 5. *Symploce cristata*, new species. Details of specialization of ninth abdominal tergite of male (type). Port-au-Prince, Haiti. (Greatly enlarged.)

Fig. 6. *Symploce bilabiata*, new species. Dorsal aspect of supra-anal plate of male (type). Culebra Island. (Greatly enlarged.)

Fig. 7. *Symploce bilabiata*, new species. Ventral aspect of subgenital plate of male (type). Culebra Island. (Greatly enlarged.)

Fig. 8. *Symploce bilabiata*, new species. Caudal aspect of apex of abdomen of male (type). Culebra Island. (Greatly enlarged.)

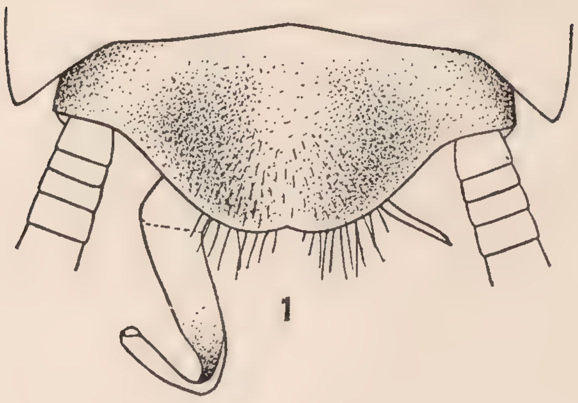
Fig. 9. *Symploce bilabiata*, new species. Marginal field and base of scapular field of dextral tegmen. Female (allotype). Culebra Island. (Greatly enlarged.)

Fig. 10. *Symploce flagellata* Hebard. Marginal field and base of scapular field of dextral tegmen. Male (paratype). Mona Island. (Greatly enlarged.)

Fig. 11. *Nesomylacris cubensis*, new genus and species. Palpus. Male (type). Twelve and one-half kilometers south of Pinar del Rio, Cuba. (Greatly enlarged.)

Fig. 12. *Nesomylacris cubensis*, new genus and species. Dorsal aspect of supra-anal plate of male (type). Twelve and one-half kilometers south of Pinar del Rio, Cuba. (Greatly enlarged.)

Fig. 13. *Nesomylacris cubensis*, new genus and species. Ventral aspect of subgenital plate of male (type). Twelve and one-half kilometers south of Pinar del Rio, Cuba. (Greatly enlarged.)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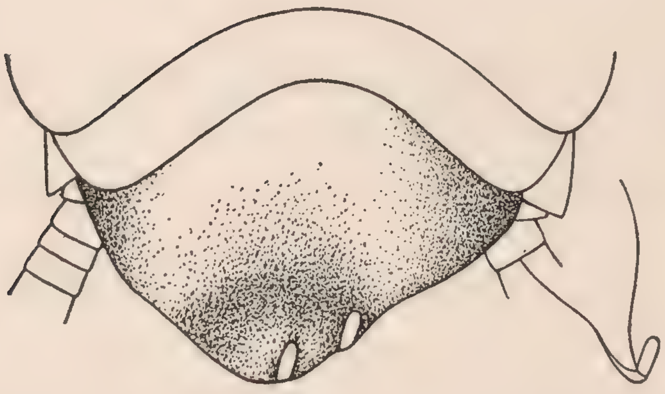
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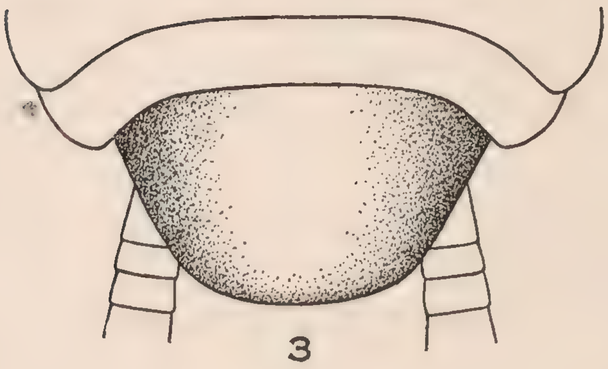
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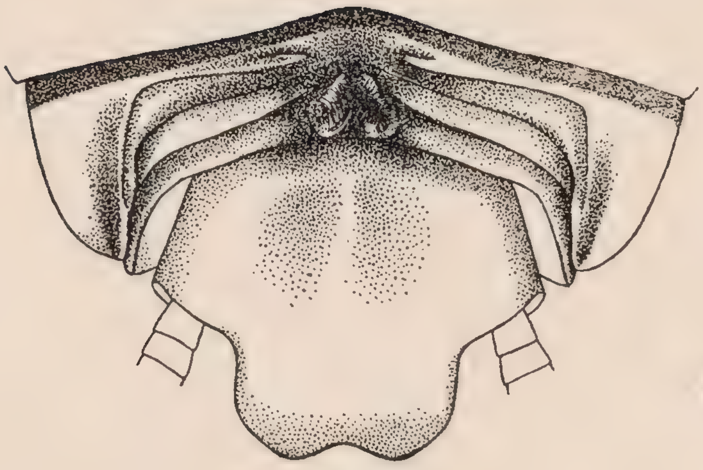
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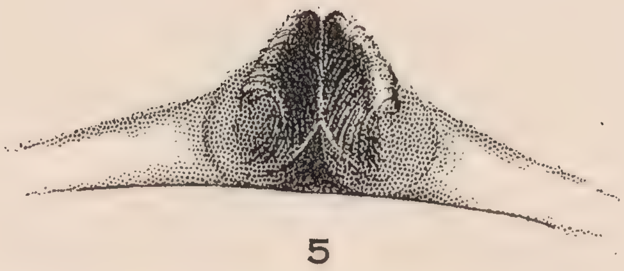
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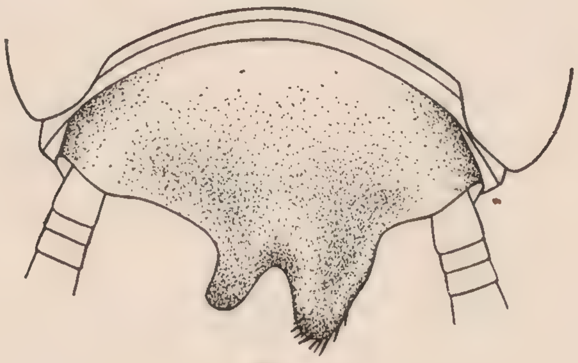
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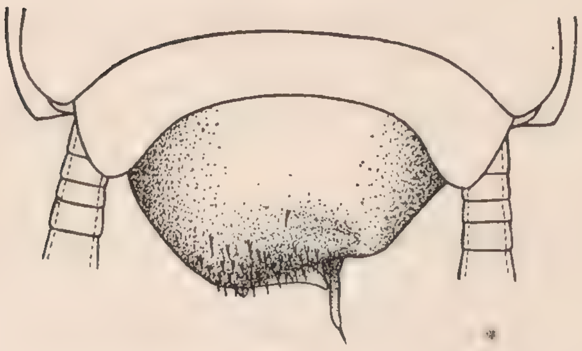
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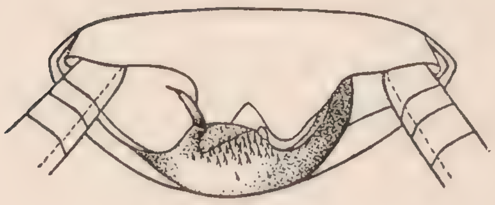
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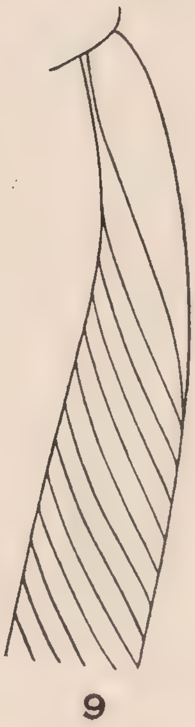
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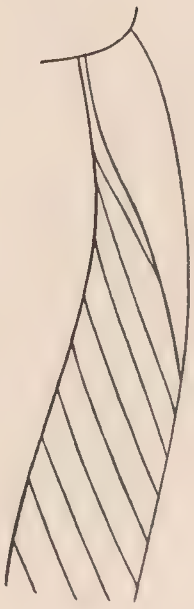
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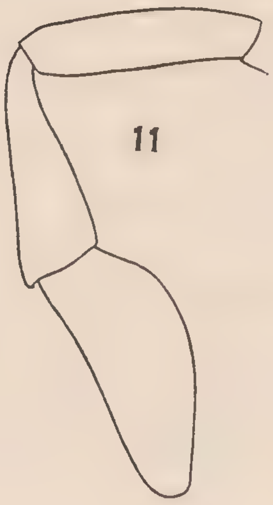
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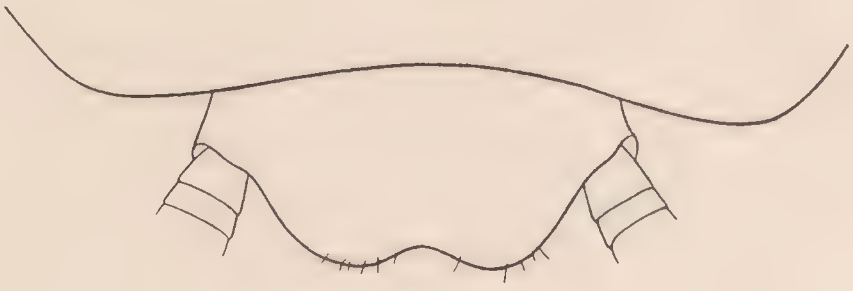
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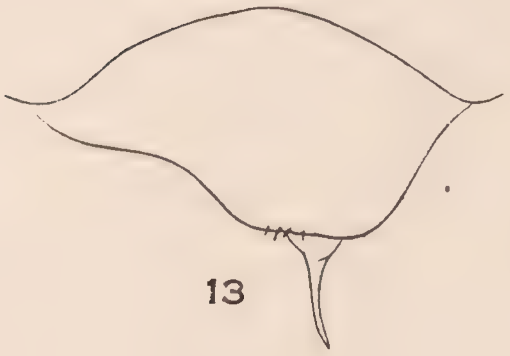
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PLATE XI

Fig. 1. *Nesomylacris cubensis*, new genus and species. Dorsal outline of male (type). Twelve and one-half kilometers south of Pinar del Rio, Cuba. (×4.)

Fig. 2. *Nesomylacris relica*, new genus and species. Outline of male (type). Stony Hill, Jamaica. (×4½.)

Fig. 3. *Nesomylacris relica*, new genus and species. Palpus. Male (type). Stony Hill, Jamaica. (Greatly enlarged.)

Fig. 4. *Nesomylacris relica*, new genus and species. Dorsal aspect of supra-anal plate of male (type). Stony Hill, Jamaica. (Greatly enlarged.)

Fig. 5. *Nesomylacris relica*, new genus and species. Ventral aspect of subgenital plate of male (type). Stony Hill, Jamaica. (Greatly enlarged.)

Fig. 6. *Pelmatosilpha coriacea* Rehn. Dorsal outline. Female. Adjuntas, Porto Rico. (×2.)

Fig. 7. *Pelmatosilpha coriacea* Rehn. Dorsal aspect of supra-anal plate of male. Baños de Coamo, Porto Rico. (Greatly enlarged.)

Fig. 8. *Pelmatosilpha coriacea* Rehn. Ventral aspect of subgenital plate of male. Baños de Coamo, Porto Rico. (Greatly enlarged.)

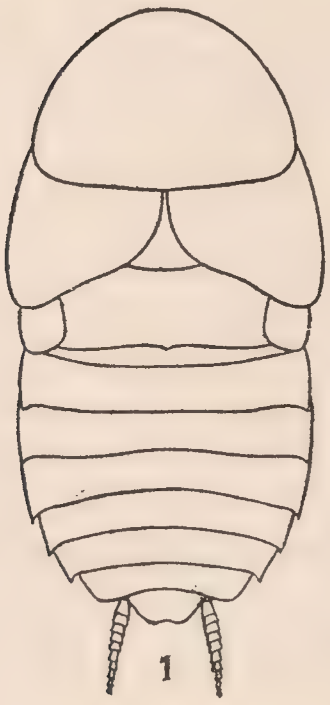
Fig. 9. *Pelmatosilpha coriacea* Rehn. Outline of sinistral genital hook of male. Baños de Coamo, Porto Rico. (Greatly enlarged.)

Fig. 10. *Pelmatosilpha coriacea* Rehn. Outline of dextral genital hook of male. Baños de Coamo, Porto Rico. (Greatly enlarged.)

Fig. 11. *Pelmatosilpha coriacea* Rehn. Outline of sinistral tegmen. Male. Mona Island. (×3.)

Fig. 12. *Pelmatosilpha purpurascens* (Kirby). Outline of sinistral genital hook of male. Long Ditton, Dominica. (Greatly enlarged.)

Fig. 13. *Pelmatosilpha purpurascens* (Kirby). Outline of dextral genital hook of male. Long Ditton, Dominica. (Greatly enlarged.)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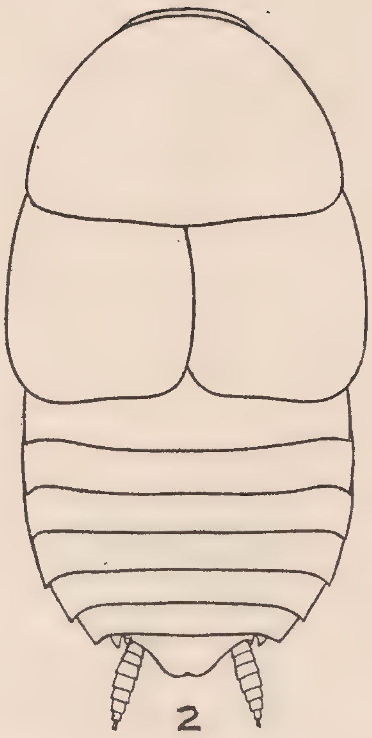
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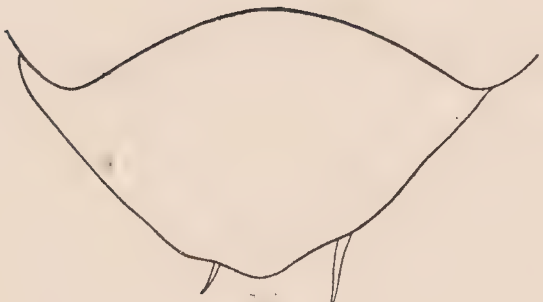
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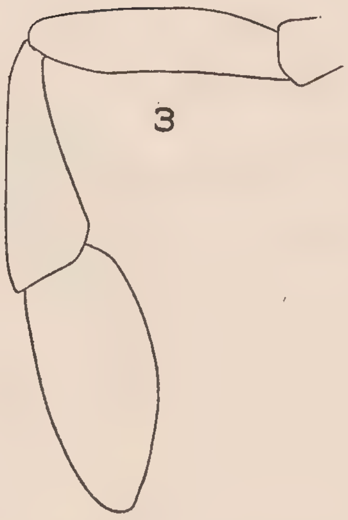
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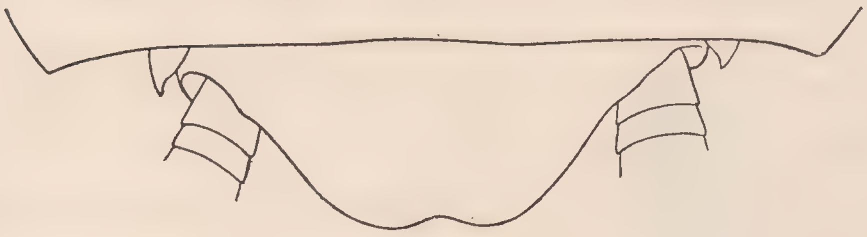
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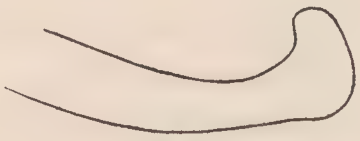
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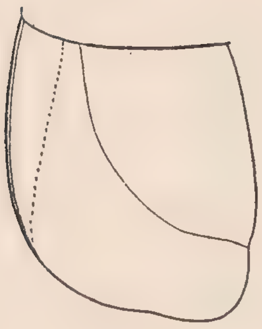
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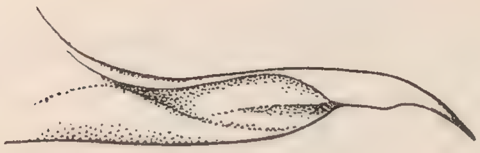
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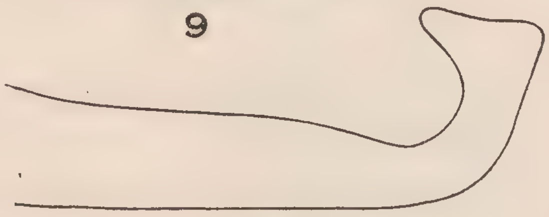
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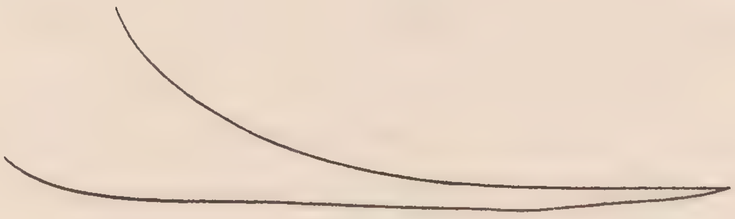
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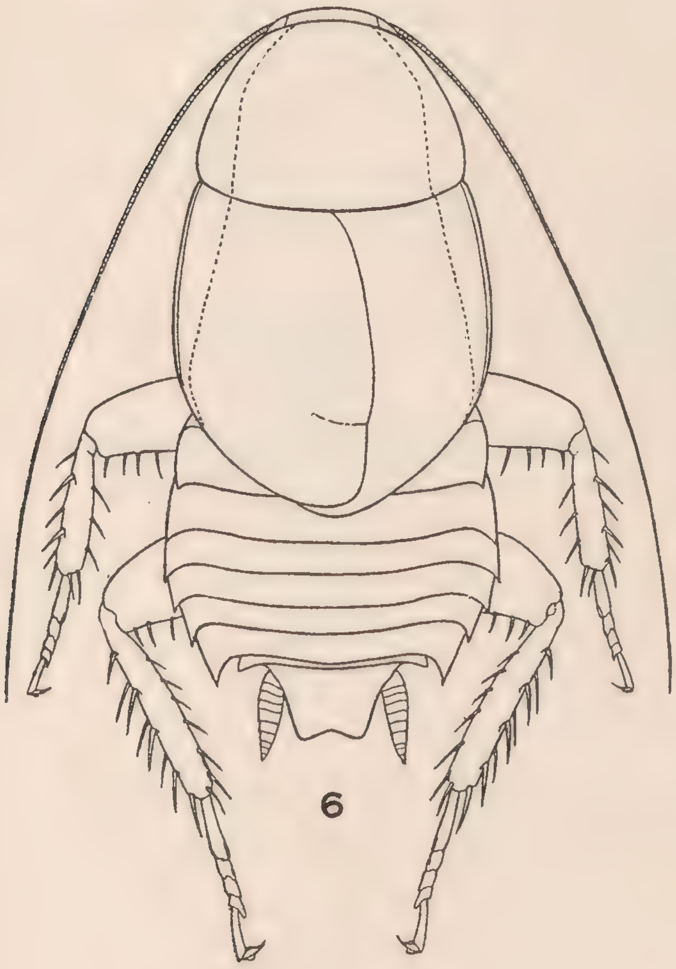
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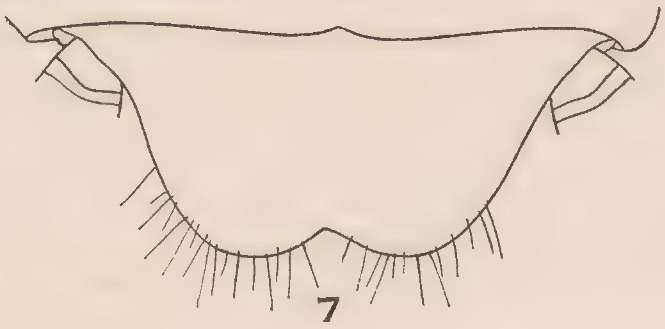
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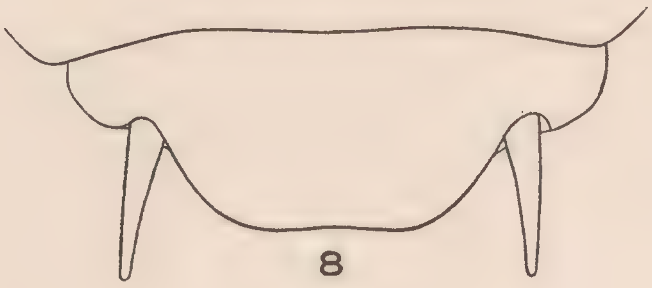
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PLATE XII

Fig. 1. *Pelmatosilpha purpurascens* (Kirby). Dorsal aspect of supra-anal plate of male. Long Ditton, Dominica. (Greatly enlarged.)

Fig. 2. *Pelmatosilpha purpurascens* (Kirby). Ventral aspect of subgenital plate of male. Long Ditton, Dominica. (Greatly enlarged.)

Fig. 3. *Pelmatosilpha occidentalis* (Saussure). Outline of sinistral tegmen. Male. St. Pierre, Martinique. (×3½.)

Fig. 4. *Pelmatosilpha occidentalis* (Saussure). Dorsal aspect of supra-anal plate and cerci of male. St. Pierre, Martinique. (Greatly enlarged.)

Fig. 5. *Pelmatosilpha occidentalis* (Saussure). Outline of sinistral genital hook of male. St. Pierre, Martinique. (Greatly enlarged.)

Fig. 6. *Eurycotis lacernata* Cabrera. Dorsal aspect. Female. Cotorro, Cuba. (×1½.)

Fig. 7. *Eurycotis lacernata* Cabrera. Cephalic aspect of face. Female. Cotorro, Cuba. (Enlarged.)

Fig. 8. *Eurycotis bahamensis* Rehn. Outline of caudal tarsus. Male. Mangrove Cay, Andros, Bahamas. (Greatly enlarged.)

Fig. 9. *Eurycotis torquinensis*, new species. Dorsal aspect. Male (type). Torquino Peak, 5800 feet, Oriente, Cuba. (×1½.)

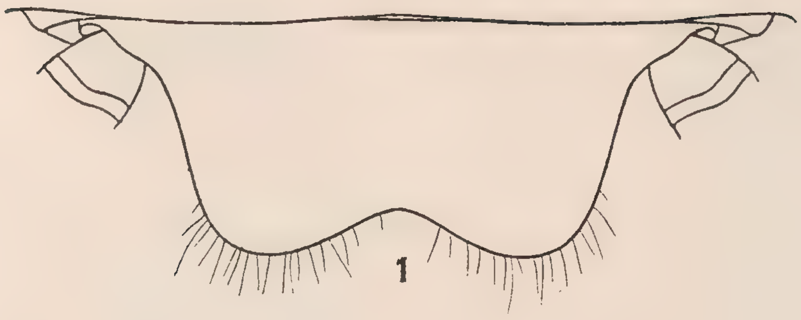
Fig. 10. *Eurycotis torquinensis*, new species. Cephalic aspect of male. Male (type). Torquino Peak, 5800 feet, Oriente, Cuba. (Enlarged.)

Fig. 11. *Eurycotis torquinensis*, new species. Outline of sinistral genital hook of male (type). Torquino Peak, 5800 feet, Oriente, Cuba. (Greatly enlarged.)

Fig. 12. *Eurycotis torquinensis*, new species. Outline of dextral genital hook of male (type). Torquino Peak, 5800 feet, Oriente, Cuba. (Greatly enlarged.)

Fig. 13. *Eurycotis balteata* Cabrera. Dorsal aspect of supra-anal plate of male. Cotorro, Cuba. (Greatly enlarged.)

Fig. 14. *Eurycotis balteata* Cabrera. Extensor face of caudal tibia. Male. Cotorro, Cuba. (Enlarged.)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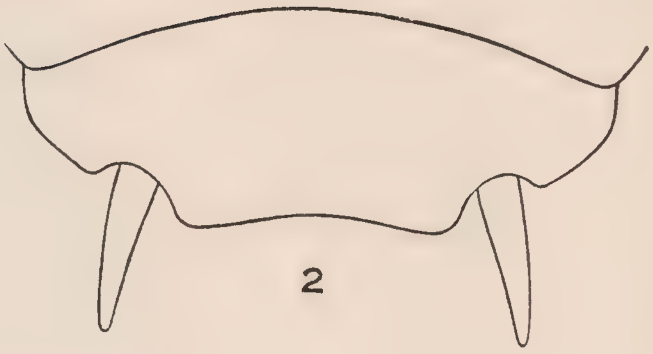
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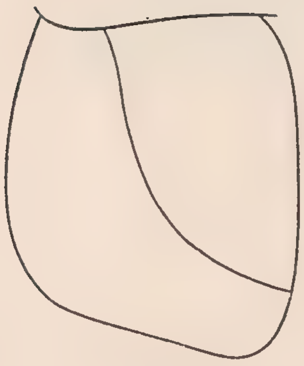
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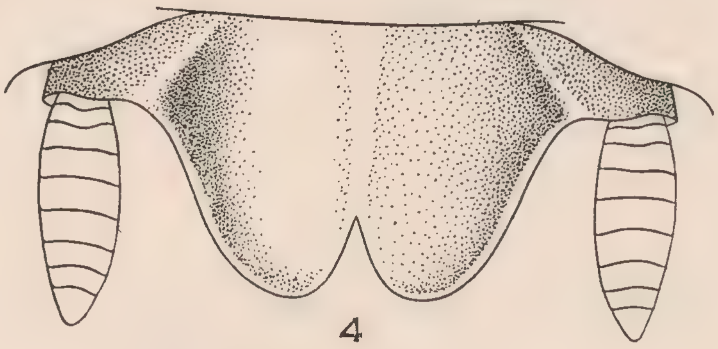
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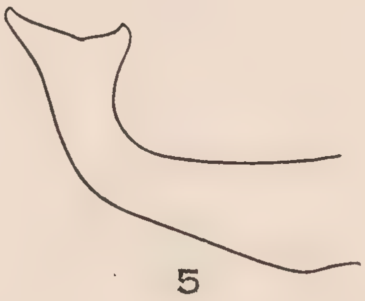
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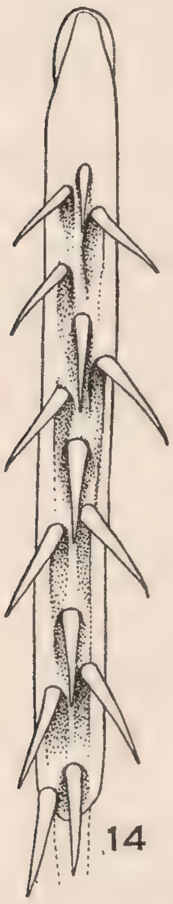
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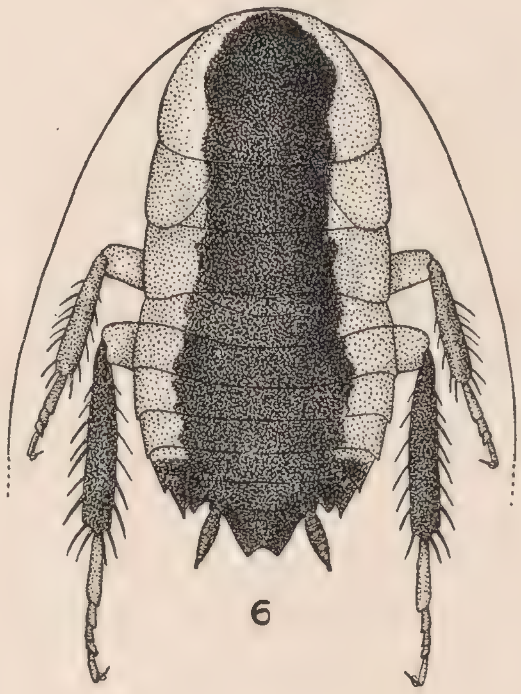
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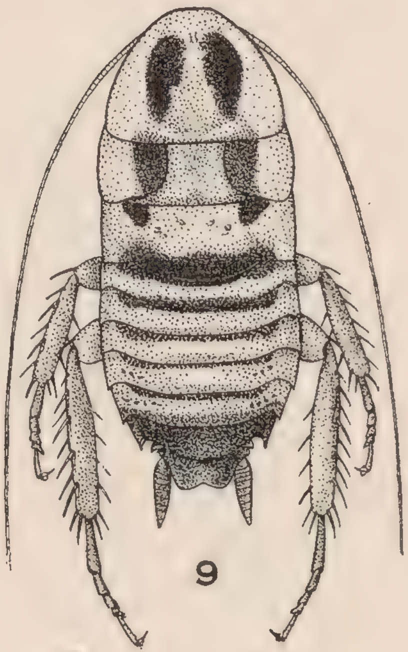
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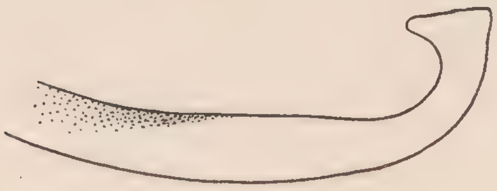
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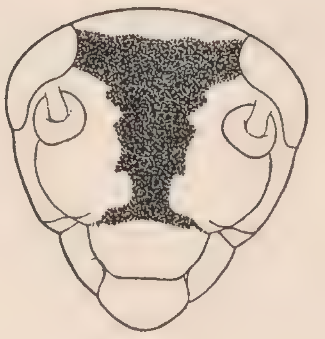
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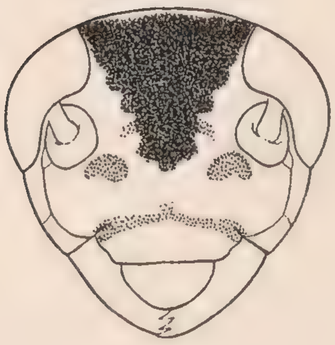
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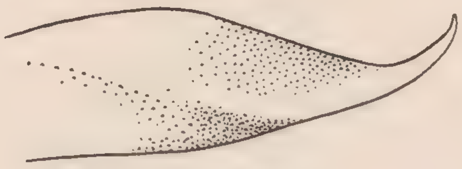
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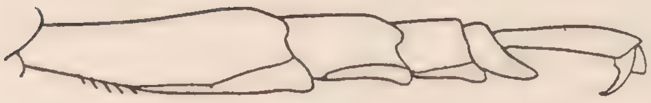
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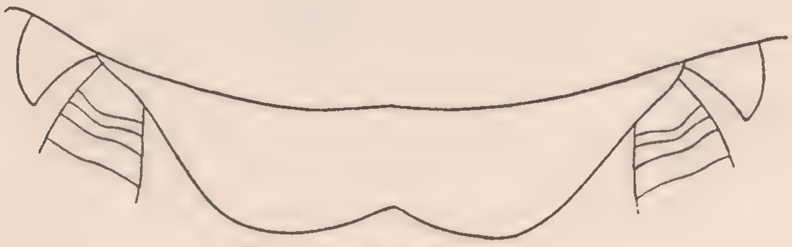
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PLATE XIII

Fig. 1. *Eurycotis balteata* Cabrera. Dorsal aspect. Male. Cotorro, Cuba. (×1½.)

Fig. 2. *Eurycotis ferrum-equinum*, new species. Dorsal aspect. Male (type). La Union, Monte Libano, Oriente, Cuba. (×1½.)

Fig. 3. *Eurycotis ferrum-equinum*, new species. Extensor face of caudal tibia. Male (type). La Union, Monte Libano, Oriente, Cuba. (Enlarged.)

Fig. 4. *Eurycotis ferrum-equinum*, new species. Dorsal aspect of supra-anal plate of male (type). La Union, Monte Libano, Oriente, Cuba. (Greatly enlarged.)

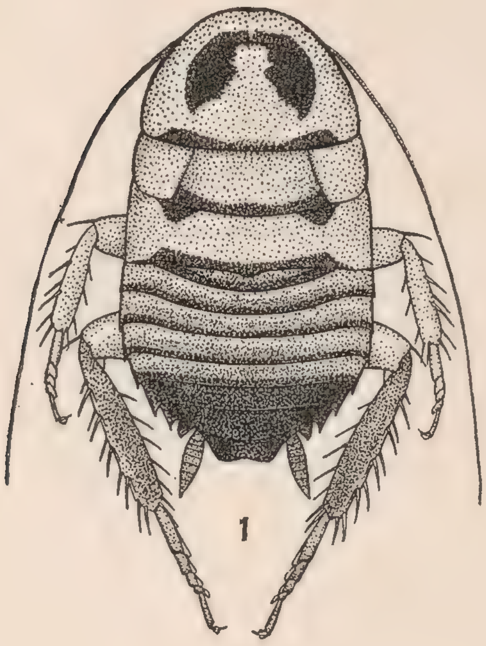
Fig. 5. *Eurycotis ferrum-equinum*, new species. Dorsal aspect of supra-anal plate of female (allotype). La Union, Monte Libano, Oriente, Cuba. (Greatly enlarged.)

Fig. 6. *Eurycotis galeoides*, new species. Dorsal aspect. Male (type). La Union, Monte Libano, Oriente, Cuba. (×1½.)

Fig. 7. *Eurycotis galeoides*, new species. Dorsal aspect of supra-anal plate of male (type). La Union, Monte Libano, Oriente, Cuba. (Greatly enlarged.)

Fig. 8. *Eurycotis dimidiata* (Bolivar). Dorsal view. Male. Arroyo Hondo, Guantanamo, Oriente, Cuba. (×1½.)

Fig. 9. *Eurycotis dimidiata* (Bolivar). Dorsal outline of supra-anal plate of male. Arroyo Hondo, Guantanamo, Oriente, Cuba. (Greatly enlarged.)



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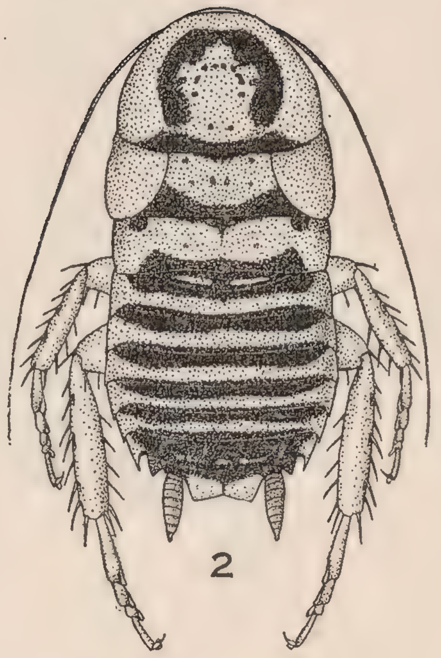

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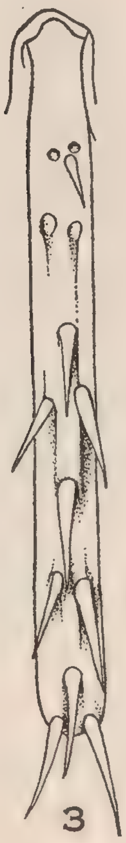

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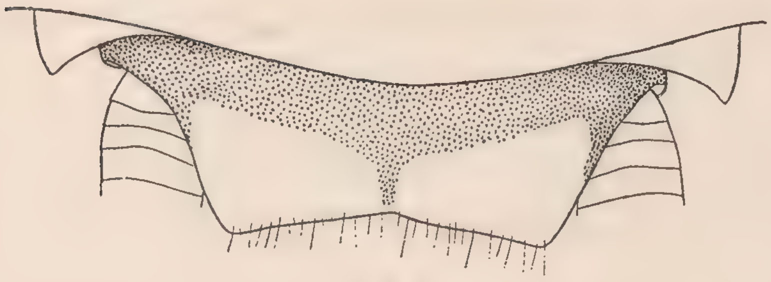

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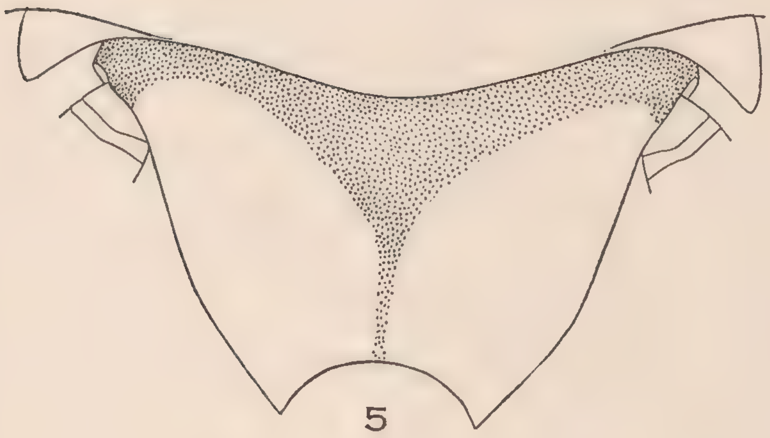

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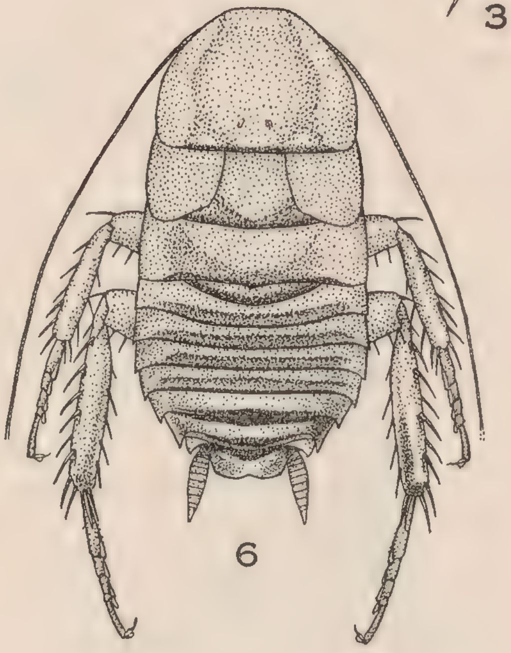

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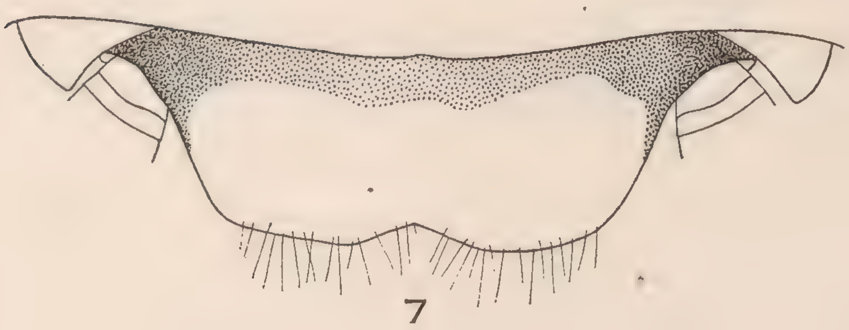

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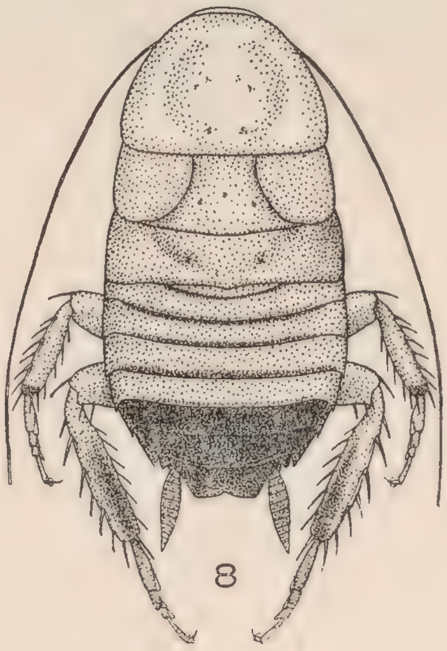

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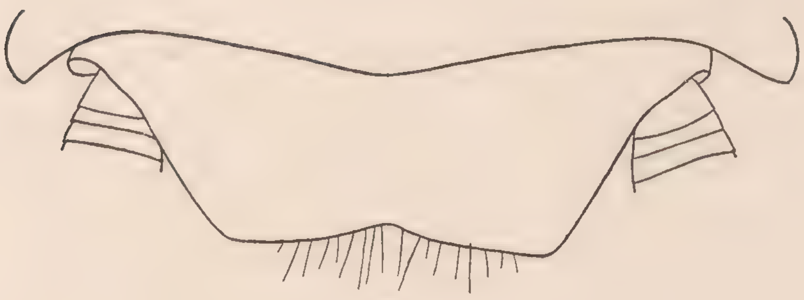

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Plate XIV

Fig. 1. *Eurycotis scalaris,* new species. Dorsal view. Male (type). Arroyo Hondo, Guanatanamo, Oriente, Cuba. (×1½.)

Fig. 2. *Eurycotis scalaris,* new species. Outline of dextral genital spine of male (type). Arroyo Hondo, Guantanamo, Oriente, Cuba. (Greatly enlarged.)

Fig. 3. *Eurycotis caraibea* (Bolivar). Dorsal view. Male. Monte Libano, Oriente, Cuba. (×1½.)

Fig. 4. *Eurycotis caraibea* (Bolivar). Outline of dextral genital spine of male (type). Monte Libano, Oriente, Cuba. (Greatly enlarged.)

Fig. 5. *Eurycotis taurus,* new species. Dorsal aspect of supra-anal plate of male (type). Vicinity of Sama, Oriente, Cuba. (Greatly enlarged.)

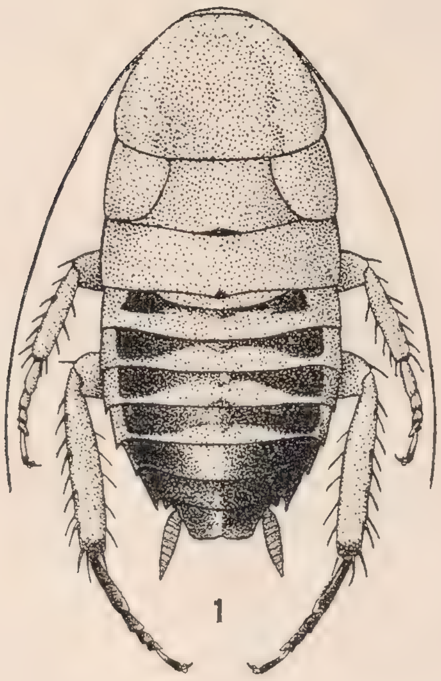
Fig. 6. *Eurycotis taurus,* new species. Ventral aspect of subgenital plate of male (type). Vicinity of Sama, Oriente, Cuba. (Greatly enlarged.)

Fig. 7. *Eurycotis taurus,* new species. Outline of sinistral genital hook of male (type). Vicinity of Sama, Oriente, Cuba. (Greatly enlarged.)

Fig. 8. *Eurycotis taurus,* new species. Dorsal view. Female (allotype). Ojo de Agua de Filipinas, Oriente, Cuba. (Natural size.)

Fig. 9. *Eurycotis cribrosa,* new species. Dorsal view. Female (type). Los Caños, Guantanamo, Oriente, Cuba. (×1½.)

Fig. 10. *Henicotyle antillarum* (Brunner). Lateral outline of caudal tarsus. Female. Laudet, Dominica. (Greatly enlarged.)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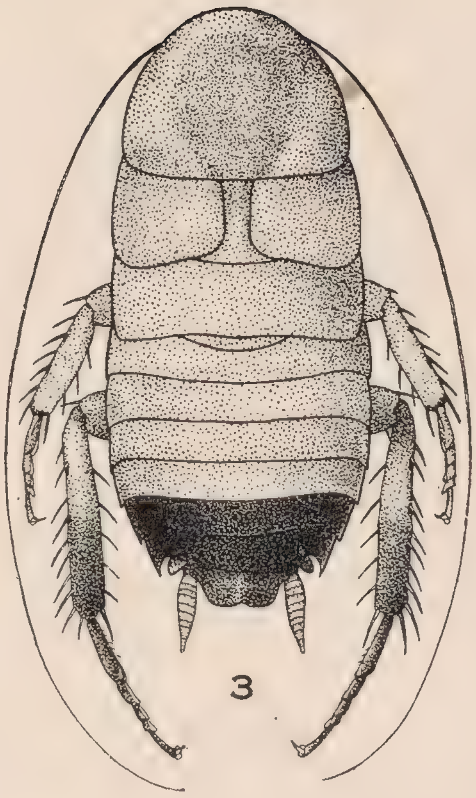
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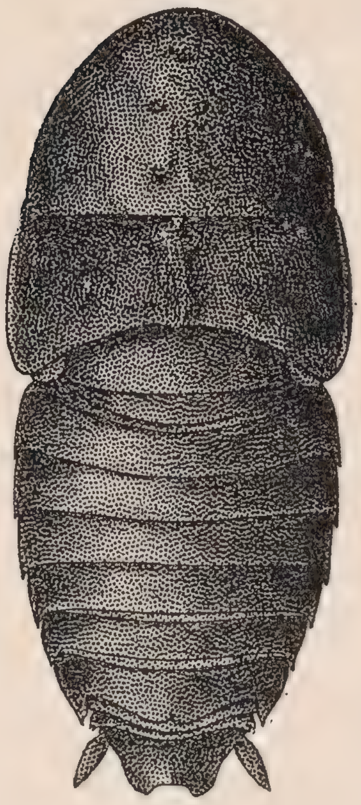
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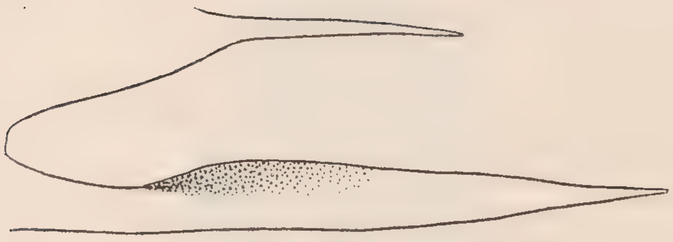
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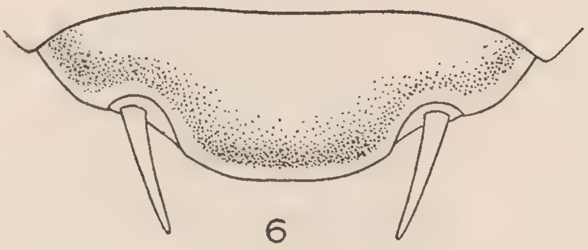
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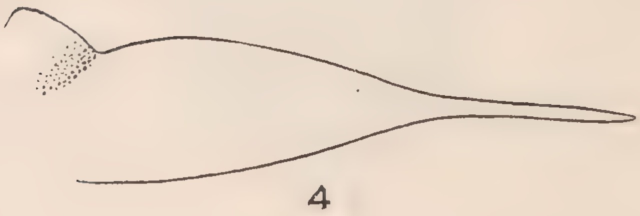
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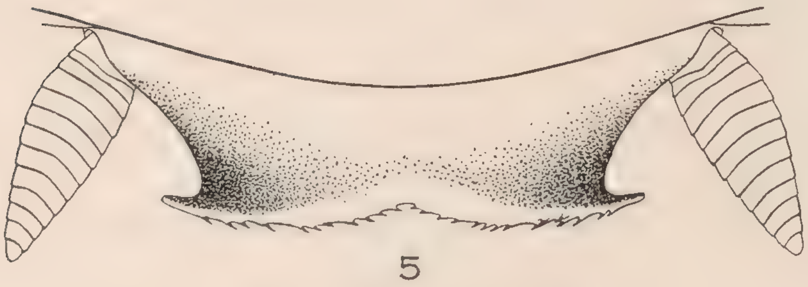
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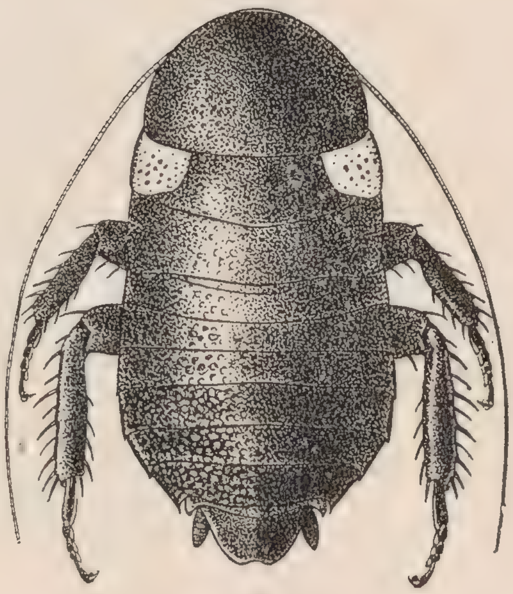
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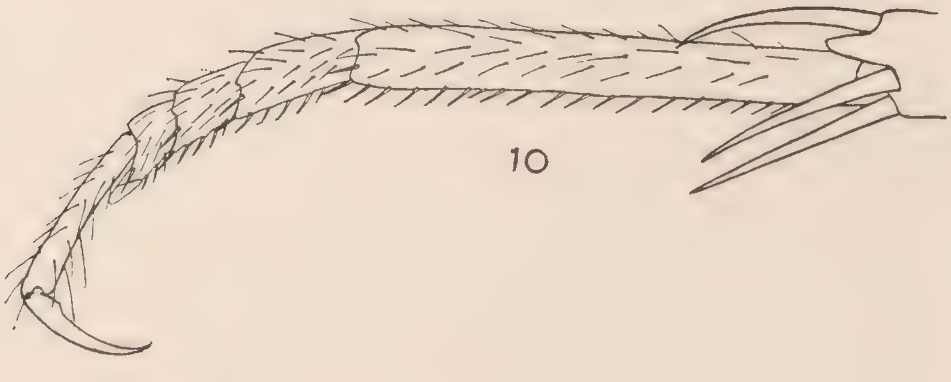
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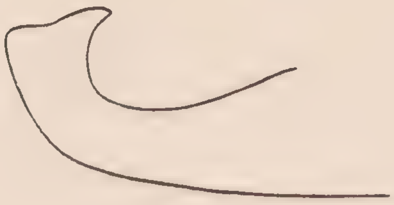
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PLATE XV

Fig. 1. *Nyctibora stygia* Walker. Dorsal aspect of supra-anal plate of male. Manville, Haiti. (Greatly enlarged.)

Fig. 2. *Nyctibora stygia* Walker. Ventral aspect of subgenital plate of male. Manville, Haiti. (Greatly enlarged.)

Fig. 3. *Nyctibora stygia* Walker. Lateral outline of caudal tarsus. Male. Manville, Haiti. (Greatly enlarged.)

Fig. 4. *Audreia jamaicana*, new species. Dorsal view. Male (type). Between Pleasant Hill and St. Helens Gap, Blue Mountains, Jamaica. (×3.)

Fig. 5. *Audreia jamaicana*, new species. Outline of distal palpal joints. Male (type). Between Pleasant Hill and St. Helens Gap, Blue Mountains, Jamaica. (Greatly enlarged.)

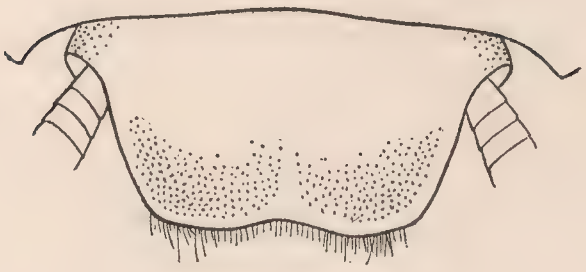
Fig. 6. *Audreia jamaicana*, new species. Ventral aspect of subgenital plate of male (type). Between Pleasant Hill and St. Helens Gap, Blue Mountains, Jamaica. (Greatly enlarged.)

Fig. 7. *Audreia jamaicana*, new species. Dorsal outline. Female (allotype). Between Pleasant Hill and St. Helens Gap, Blue Mountains, Jamaica. (×3.)

Fig. 8. *Audreia hamiltoni* (Rehn). Dorsal view. Male (allotype). Torquino Peak, Oriente, Cuba. (×3.)

Fig. 9. *Audreia hamiltoni* (Rehn). Ventral aspect of subgenital plate of male (allotype). Torquino Peak, Oriente, Cuba. (Greatly enlarged.)

Fig. 10. *Audreia hamiltoni* (Rehn). Outline of distal palpal joints. Male (allotype). Torquino Peak, Oriente, Cuba. (Greatly enlarged.)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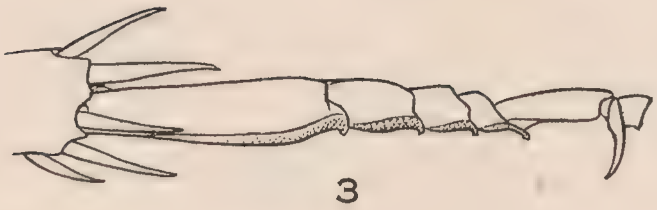
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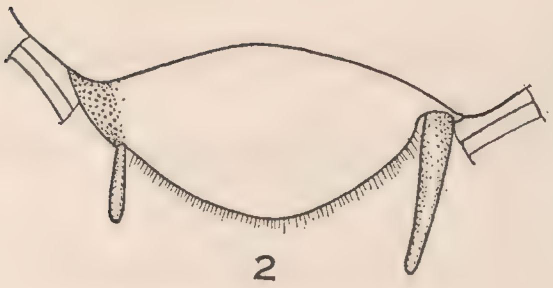
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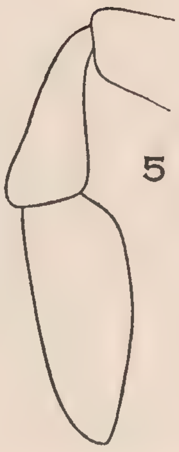
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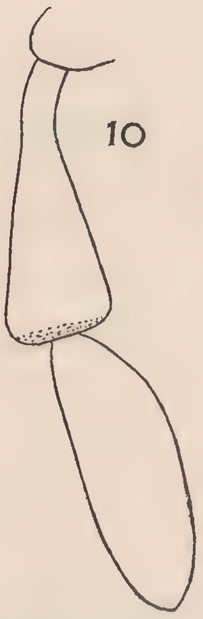
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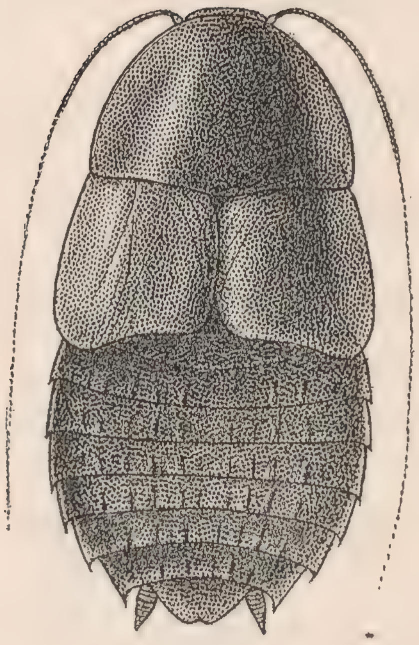
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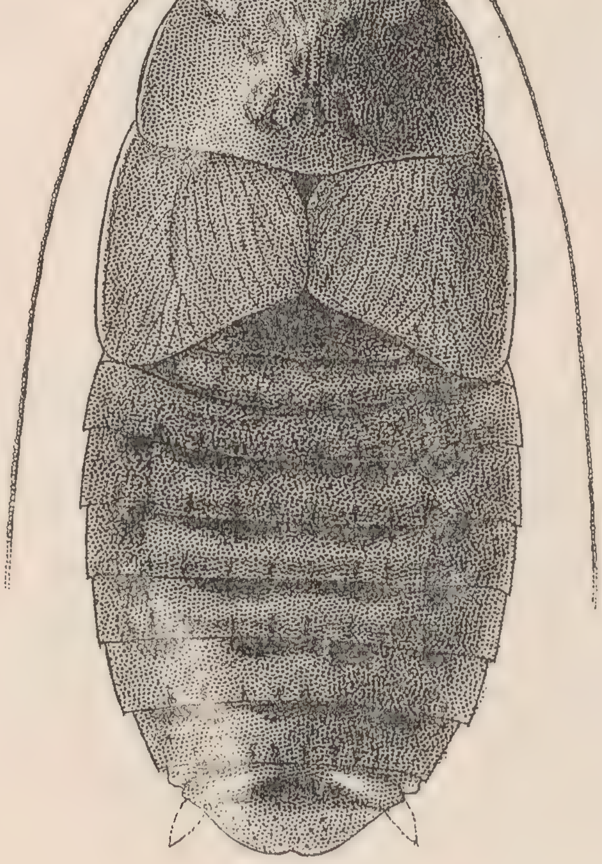
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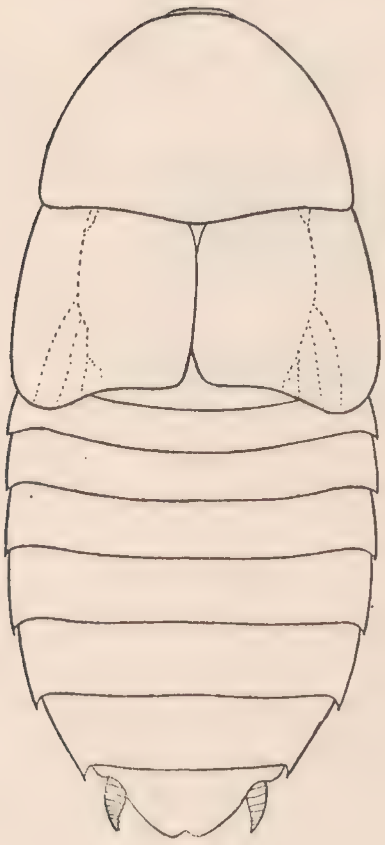
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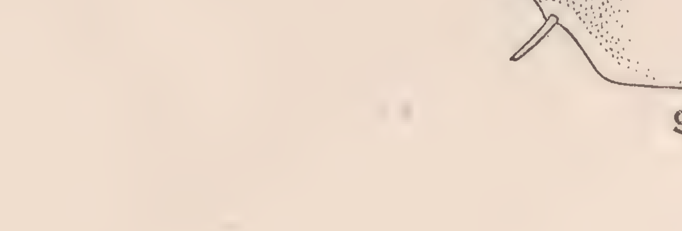
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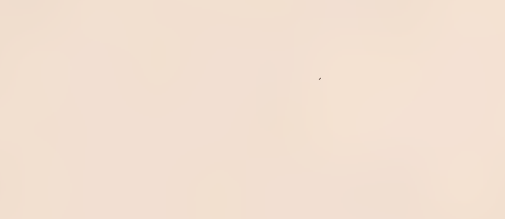
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PLATE XVI

Fig. 1. *Nyctibora lutzi*, new species. Dorsal aspect of supra-anal plate of male (type). Ensenada, Porto Rico. (Greatly enlarged.)

Fig. 2. *Nyctibora lutzi*, new species. Dorsal outline of pronotum. Male (type). Ensenada, Porto Rico. (×2.)

Fig. 3. *Nyctibora brunnea* (Thunberg). Dorsal aspect of supra-anal plate of male. Peixe Boi, Pará, Brazil. (Greatly enlarged.)

Fig. 4. *Nyctibora brunnea* (Thunberg.) Dorsal outline of pronotum. Male. Peixe Boi, Pará, Brazil. (×2.)

Fig. 5. *Nyctibora lævigata* (Beauvois). Dorsal aspect of supra-anal plate of male. Montego Bay, Jamaica. (Greatly enlarged.)

Fig. 6. *Epilampra insularis* Bolivar. Cephalic aspect of head. Female. El Alto de la Union, Oriente, Cuba. (Enlarged.)

Fig. 7. *Epilampra insularis* Bolivar. Dorsal aspect of supra-anal plate of female. El Alto de la Union, Oriente, Cuba. (Greatly enlarged.)

Fig. 8. *Epilampra insularis* Bolivar. Ventral aspect of apex of abdomen of female. El Alto de la Union, Oriente, Cuba. (×1½.)

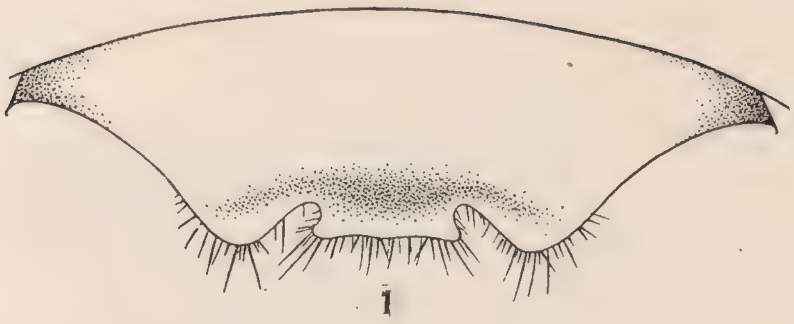
Fig. 9. *Epilampra tainana*, new species. Dorsal view. Female (type). Monte Libano, Oriente, Cuba. (×1½.)

Fig. 10. *Epilampra tainana*, new species. Cephalic aspect of head. Female (type). Monte Libano, Oriente, Cuba. (Enlarged.)

Fig. 11. *Epilampra tainana*, new species. Ventral aspect of apex of abdomen of female (type). Monte Libano, Oriente, Cuba. (×1½.)

Fig. 12. *Epilampra mona*, new species. Cephalic aspect of head. Female (type). Playa Sardinera, Mona Island. (Enlarged.)

Fig. 13. *Epilampra mona*, new species. Dorsal aspect of supra-anal plate of female (type). Playa Sardinera, Mona Island. (Greatly enlarged.)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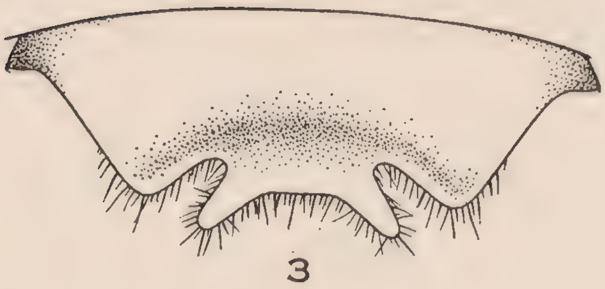
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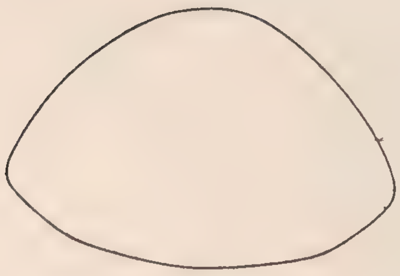
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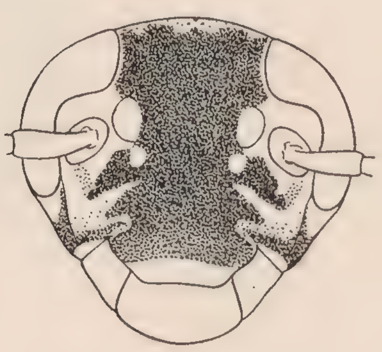
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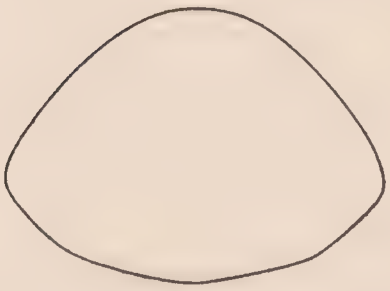
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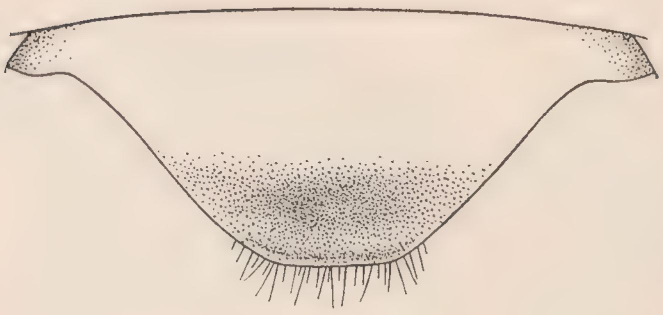
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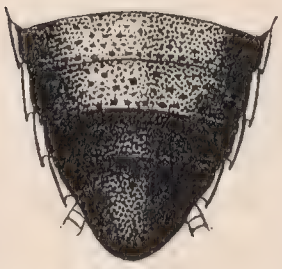
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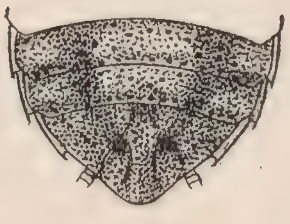
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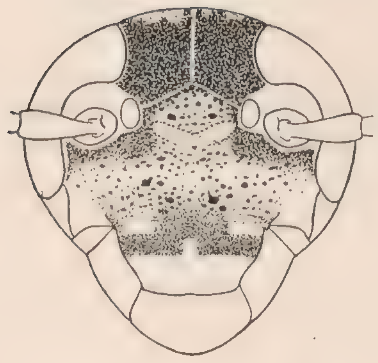
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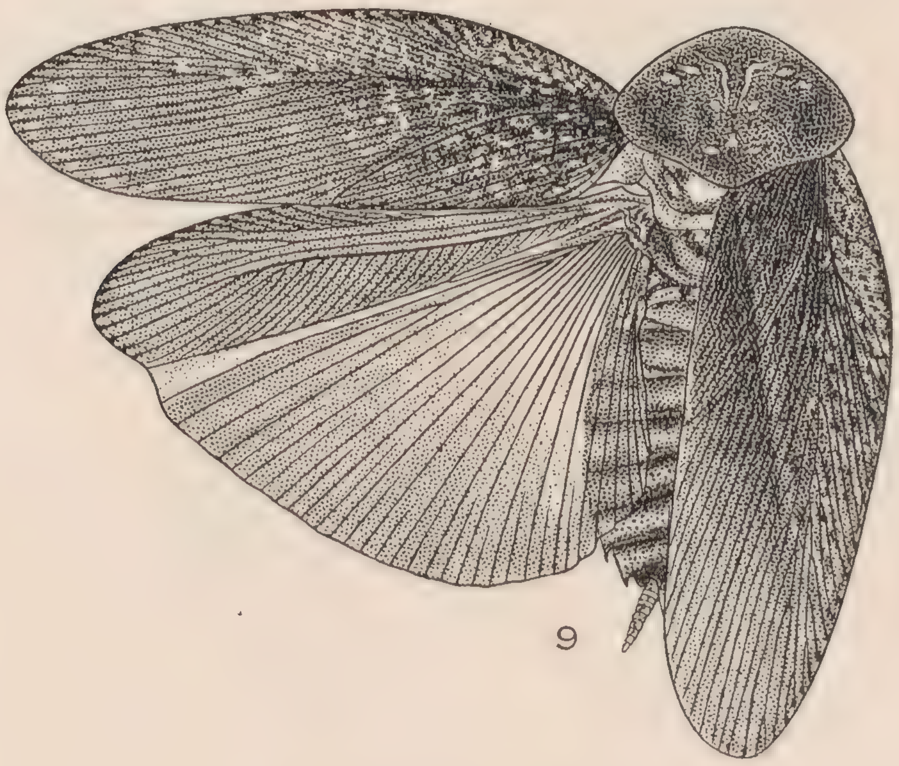
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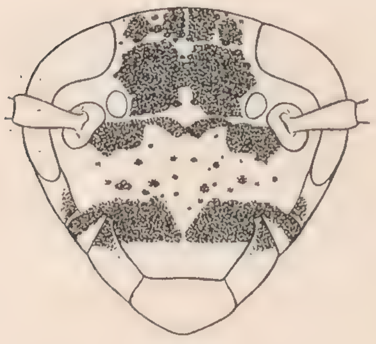
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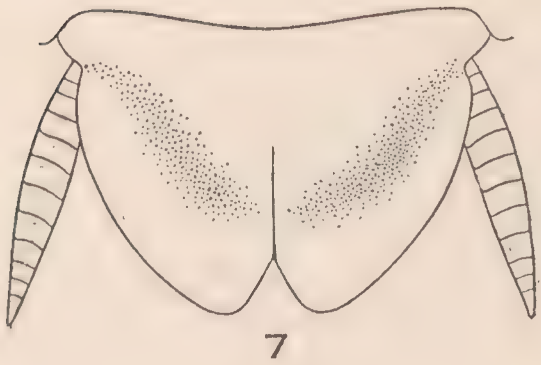
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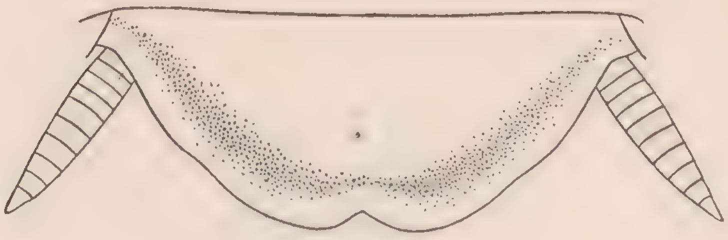
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PLATE XVII

Fig. 1. *Epilampra mona*, new species. Dorsal view. Female (type). Playa Sardinera, Mona Island. (×2.)

Fig. 2. *Epilampra abdomen-nigrum* (DeGeer). Cephalic aspect of head. Female. Grenada, British West Indies. (Enlarged.)

Fig. 3. *Epilampra abdomen-nigrum* (DeGeer). Dorsal aspect of supra-anal plate of female. Grenada, British West Indies. (Greatly enlarged.)

Fig. 4. *Epilampra gundlachi*, new species. Cephalic aspect of head. Male (type). Baracoa, Oriente, Cuba. (Enlarged.)

Fig. 5. *Epilampra gundlachi*, new species. Dorsal aspect of supra-anal of male (type). Baracoa, Oriente, Cuba. (Greatly enlarged.)

Fig. 6. *Epilampra burmeisteri* (Guérin). Cephalic aspect of head. Male. Cuba. (Enlarged.)

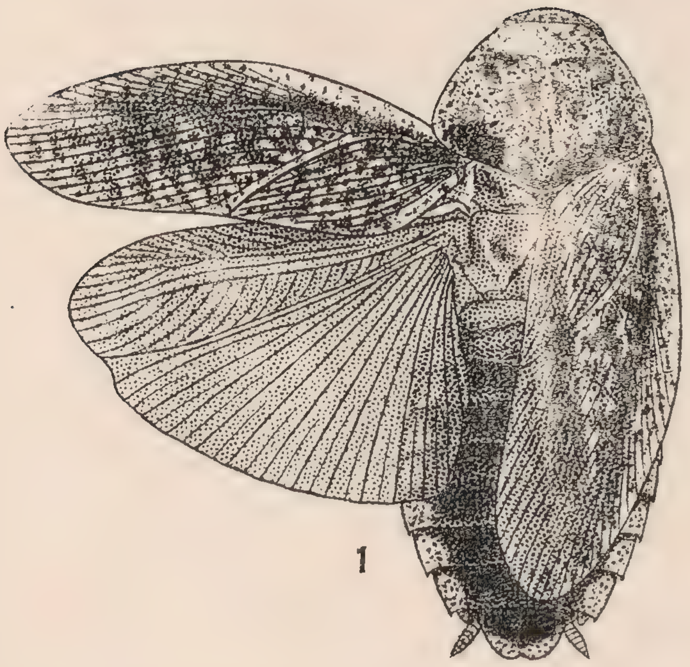
Fig. 7. *Epilampra burmeisteri* (Guérin). Dorsal aspect of supra-anal plate of male. Cuba. (Greatly enlarged.)

Fig. 8. *Epilampra wheeleri* Rehn. Cephalic aspect of dorsal section of head. Male. Adjuntas, Porto Rico. (Greatly enlarged.)

Fig. 9. *Epilampra wheeleri* Rehn. Cephalic aspect of dorsal section of head. Female. Porto Rico. (Greatly enlarged.)

Fig. 10. *Epilampra wheeleri* Rehn. Cephalic aspect of head. Female. Porto Rico. (Enlarged.)

Fig. 11. *Epilampra quisqueiana*, new species. Dorsal view. Male (type). San Lorenzo, Dominican Republic. (×2.)



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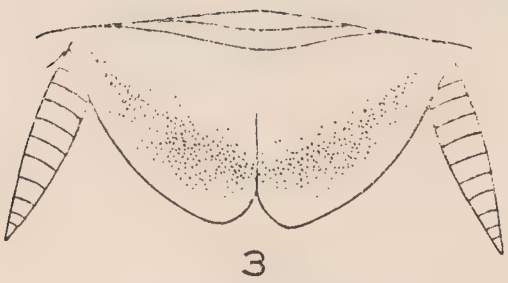

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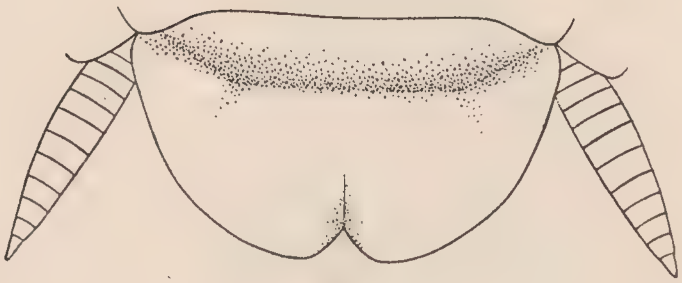

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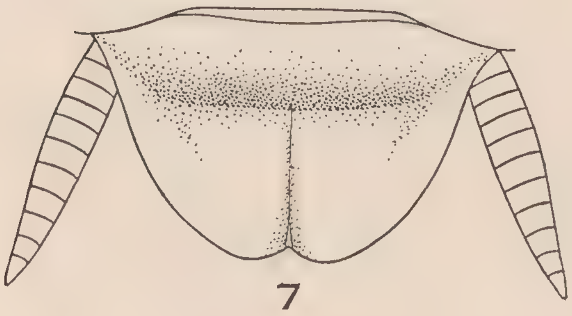

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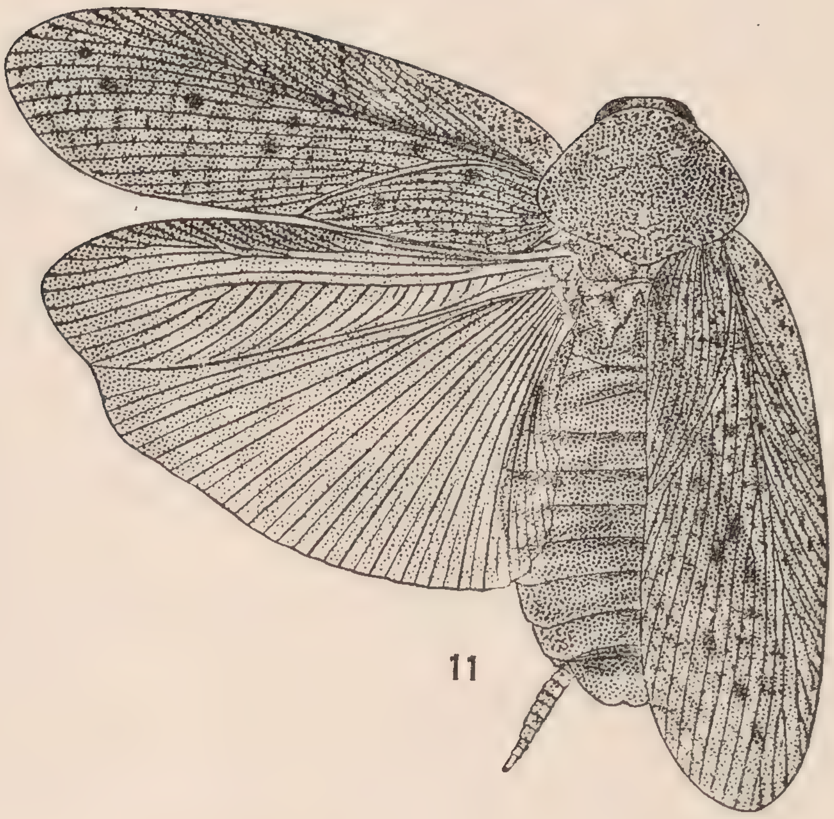

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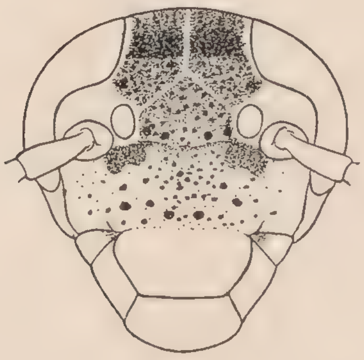

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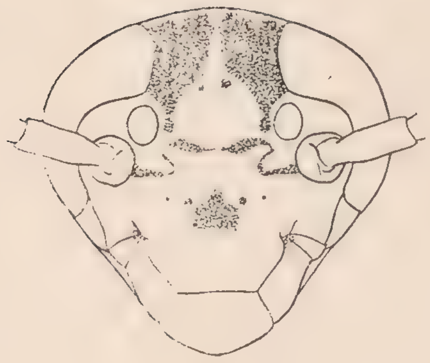

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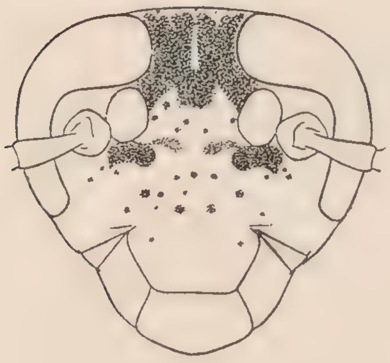

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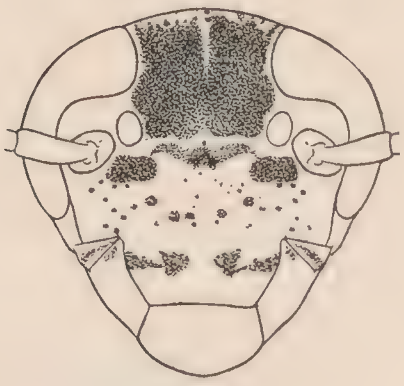

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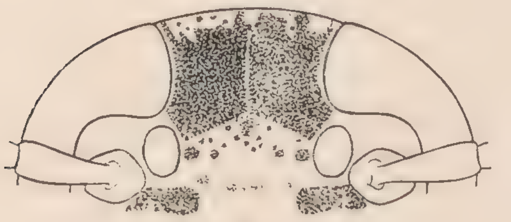

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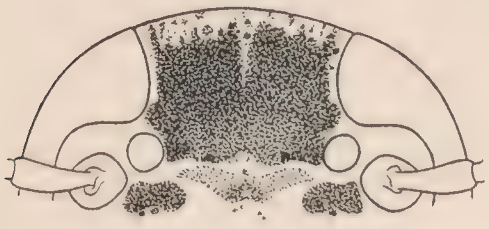

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PLATE XVIII

Fig. 1. *Epilampra gundlachi*, new species. Sinistral tegmen. Male (type). Baracoa, Oriente, Cuba. (×2⅖.)

Fig. 2. *Epilampra gundlachi*, new species. Sinistral wing. Male (type). Baracoa, Oriente, Cuba. (×2⅖.)

Fig. 3. *Epilampra burmeisteri* (Guérin). Sinistral tegmen. Male. Cuba. (×2⅖.)

Fig. 4. *Epilampra burmeisteri* (Guérin). Sinistral wing. Male. Cuba. (×2⅖.)

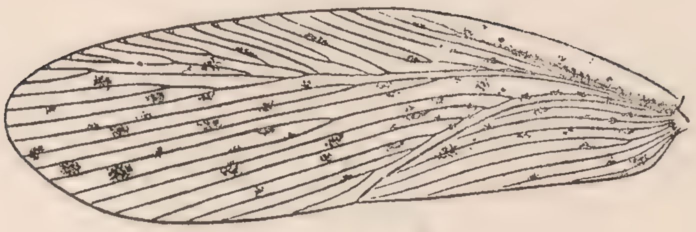
Fig. 5. *Calolampra aliena*, new species. Dorsal view. Male (type). Haiti. (×2⅖.)

Fig. 6. *Epilampra quisqueiana*, new species. Cephalic aspect of head. Male (type). San Lorenzo, Dominican Republic. (Enlarged.)

Fig. 7. *Calolampra aliena*, new species. Cephalic aspect of head. Male (type). Haiti. (Enlarged.)

Fig. 8. *Calolampra aliena*, new species. Dorsal aspect of supra-anal plate of male (type). Haiti. (Greatly enlarged.)

Fig. 9. *Calolampra aliena*, new species. Ventral aspect of subgenital plate of male (type). Haiti. (Greatly enlarged.)



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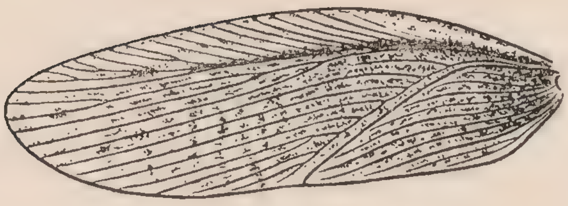

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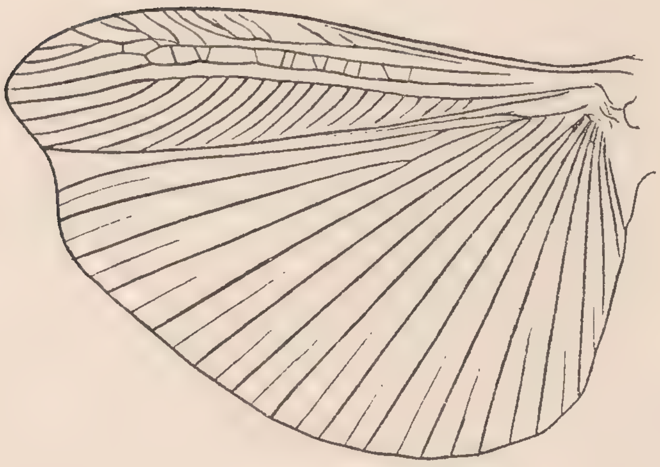

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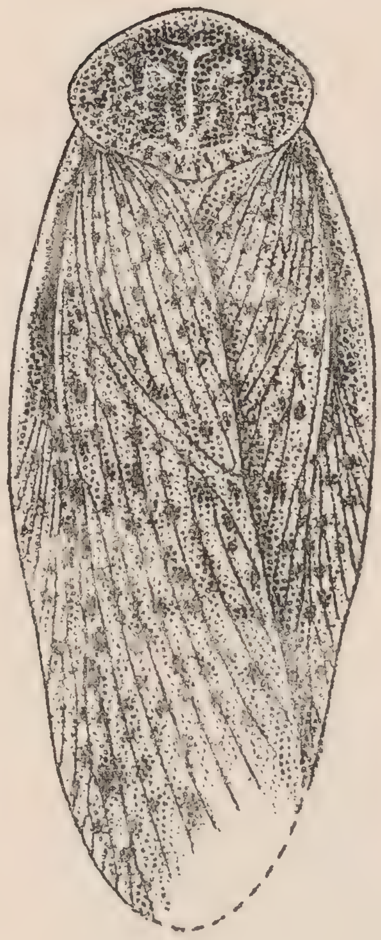

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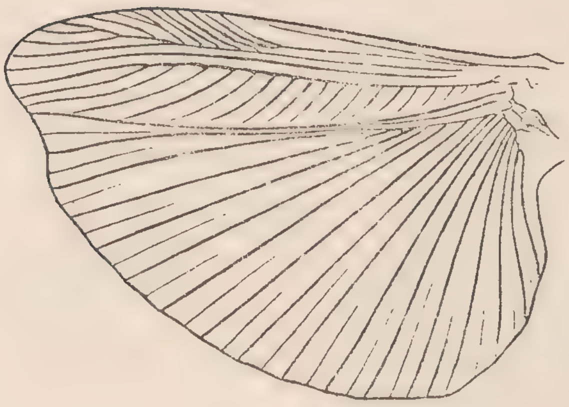

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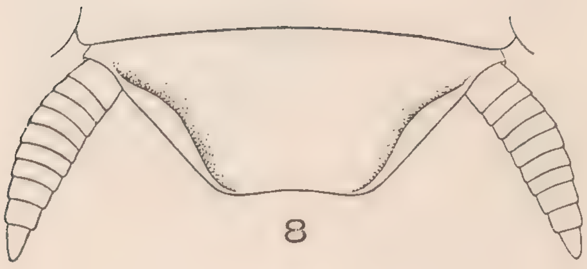

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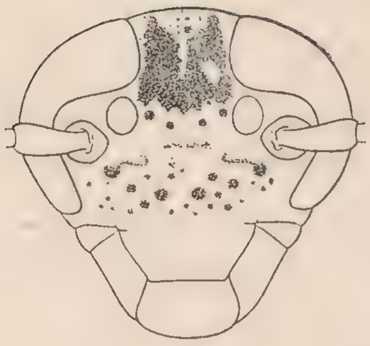

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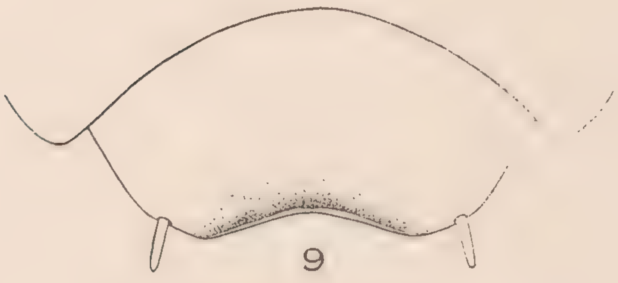

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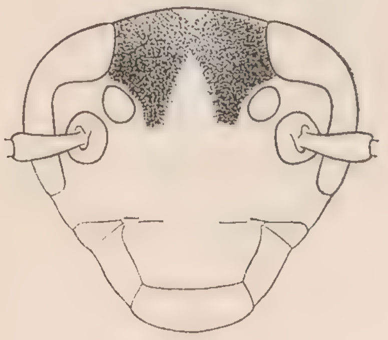

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PLATE XIX

Fig. 1. *Panchlora sagax,* new species. Ventral aspect of apex of abdomen. Male (type). Long Ditton, Dominica. (Greatly enlarged.)

Fig. 2. *Panchlora sagax,* new species. Dorsal outline of pronotum. Male (type). Long Ditton, Dominica. (×4.)

Fig. 3. *Panchlora sagax,* new species. Cephalic aspect of dorsal section of head. Male (type). Long Ditton, Dominica. (Greatly enlarged.)

Fig. 4. *Panchlora sagax,* new species. Ventral aspect of apex of abdomen. Female (allotype). Laudet, Dominica. (Greatly enlarged.)

Fig. 5. *Panchlora antillarum* Saussure. Cephalic aspect of dorsal section of head. Male. Higural, Dominican Republic. (Greatly enlarged.)

Fig. 6. *Panchlora antillarum* Saussure. Ventral aspect of apex of abdomen. Male. Higural, Dominican Republic. (Greatly enlarged.)

Fig. 7. *Panchlora antillarum* Saussure. Dorsal outline of pronotum. Male. Higural, Dominican Republic. (×4.)

Fig. 8. *Blaberus discoidalis* Serville, Dorsal view. Male. Ferry River, Jamaica. (Natural size.)

Fig. 9. *Hemiblabera tenebricosa,* new species. Dorsal view. Male (type). Santiago de los Caballeros, Dominican Republic. (Natural size.)

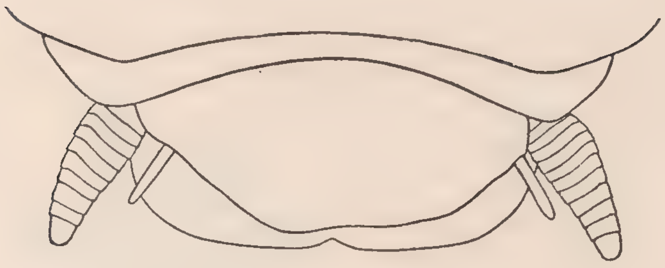
Fig. 10. *Hemiblabera tenebricosa,* new species. Dorsal view. Female (allotype). Puerto Plata, Dominican Republic. (Natural size.)

Fig. 11. *Hemiblabera tenebricosa,* new species. Outline of cephalic femur. Female (allotype). Puerto Plata, Dominican Republic. (Greatly enlarged.)

Fig. 12. *Hemiblabera pabulator,* new species. Dorsal view. Male (type). Mangrove Cay, Bahamas. (Natural size.)

Fig. 13. *Hemiblabera pabulator,* new species. Dorsal outline of tegmina. Female (allotype). Nassau, Bahamas. (×1¼.)

Fig. 14. *Aspiduchus deplanatus* (Saussure). Outline of cephalic femur. Male. Corozal, Porto Rico. (Greatly enlarged.)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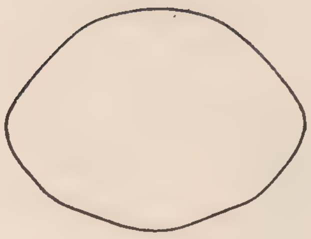
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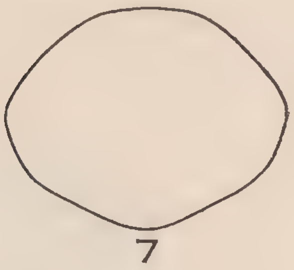
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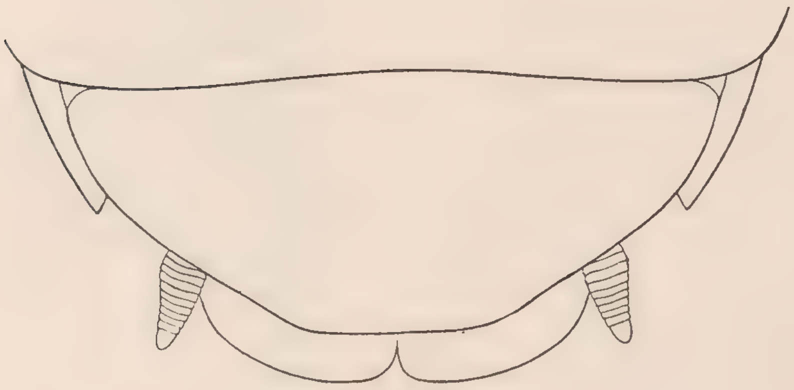
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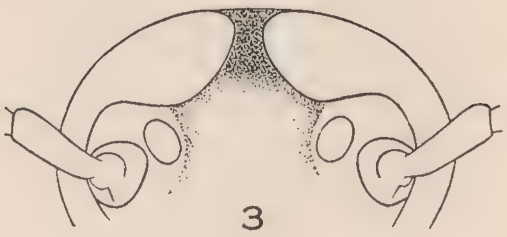
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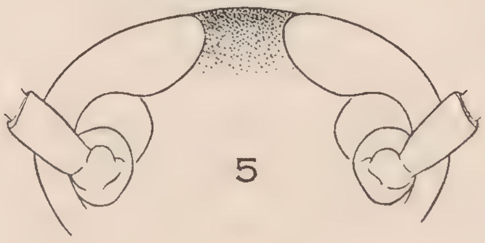
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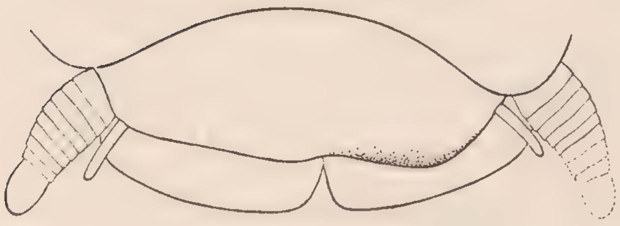
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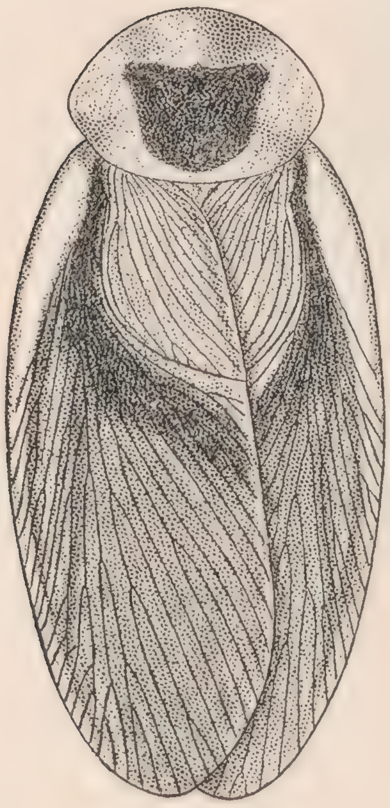
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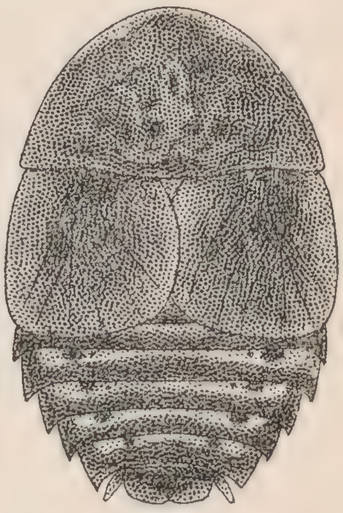
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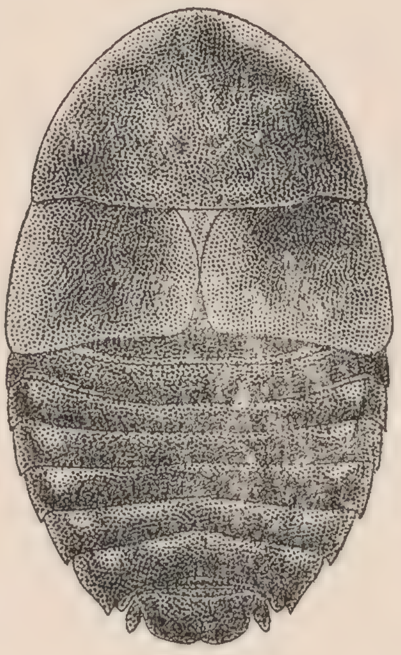
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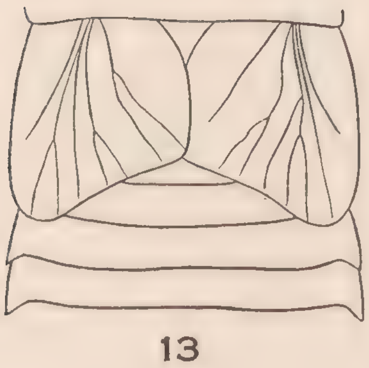
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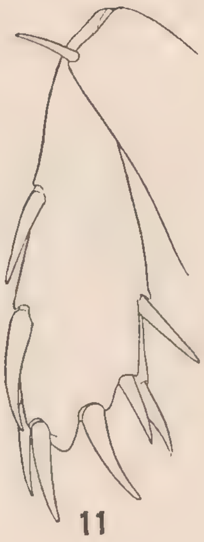
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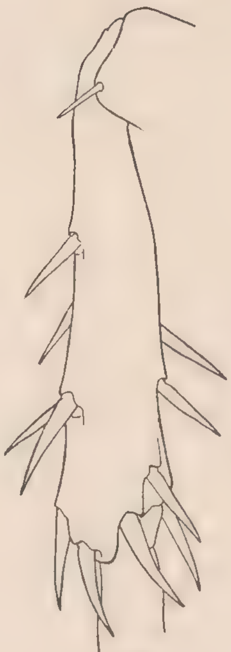
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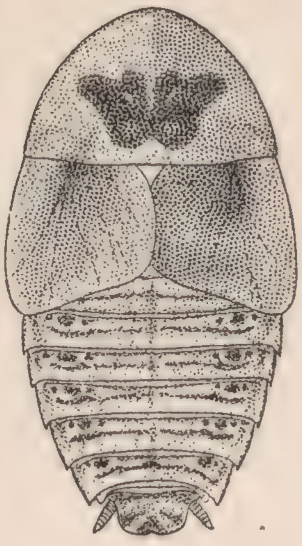
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PLATE XX

Fig. 1. *Holocompsa metallica*, new species. Dextral tegmen. Male (type). Sanchez, Dominican Republic. (×12.)

Fig. 2. *Holocompsa metallica*, new species. Dorsal outline of pronotum. Male (type). Sanchez, Dominican Republic. (×12.)

Fig. 3. *Simblerastes jamaicensis*, new genus and species. Dorsal view. Female (type). Liguanea Plain, Jamaica. (×8½.)

Fig. 4. *Simblerastes jamaicensis*, new genus and species. Outline of head in cephalic aspect. Female (type). Liguanea Plain, Jamaica. (Greatly enlarged.)

Fig. 5. *Simblerastes jamaicensis*, new genus and species. Ventral aspect of subgenital plate of female (type). Liguanea Plain, Jamaica. (Greatly enlarged.)

Fig. 6. *Pholadoblatta inusitata* (Rehn). Dorsal view. Male (type). Andros Island, Bahamas. (×11.)

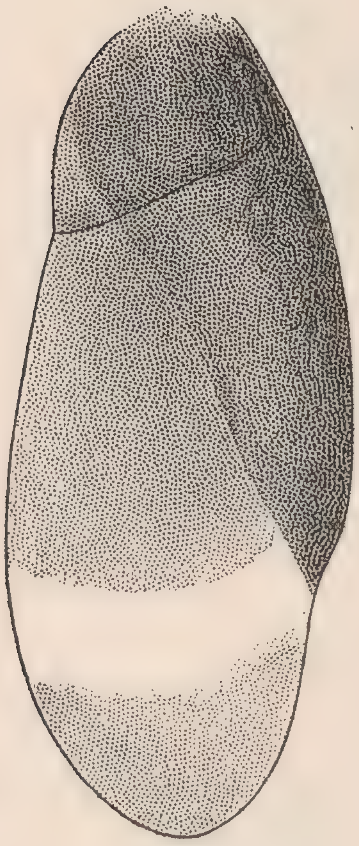
Fig. 7. *Pholadoblatta inusitata* (Rehn). Ventral aspect of subgenital plate of male (type). Andros Island, Bahamas. (Greatly enlarged.)

Fig. 8. *Pholadoblatta inusitata* (Rehn). Caudal limb. Male (type). Andros Island, Bahamas. (Greatly enlarged.)

Fig. 9. *Chorisoneura barbadensis*, new species. Interspace between eyes in cephalic aspect. Male (type). Barbados. (Greatly enlarged.)

Fig. 10. *Chorisoneura barbadensis*, new species. Pronotal pattern. Male (type). Barbados. (×10.)

Fig. 11. *Chorisoneura barbadensis*, new species. Styles and subgenital plate of male (type). Barbados. (Greatly enlarged.)



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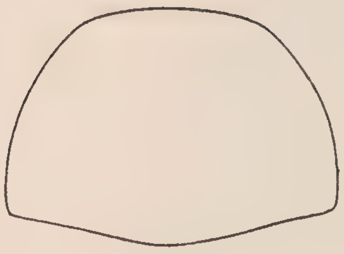

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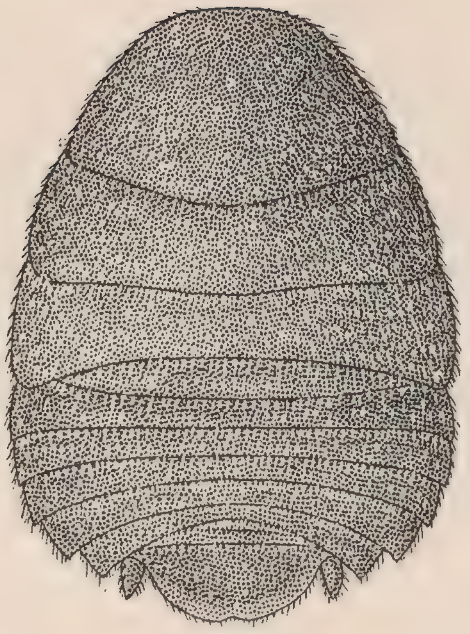

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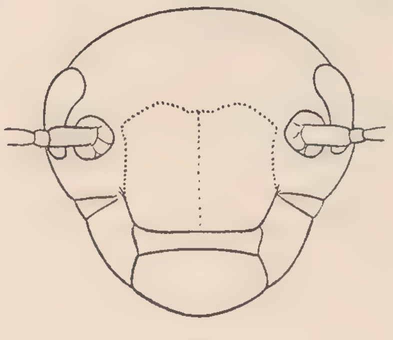

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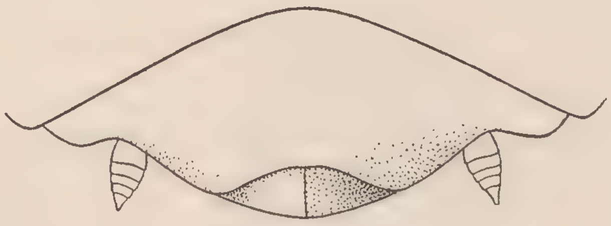

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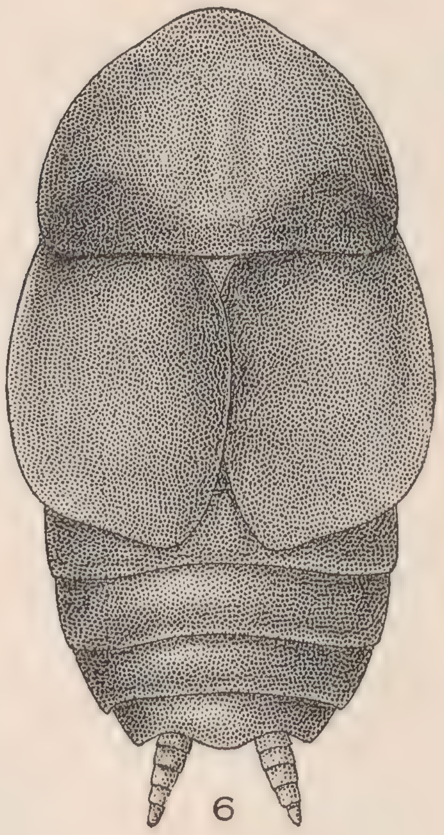

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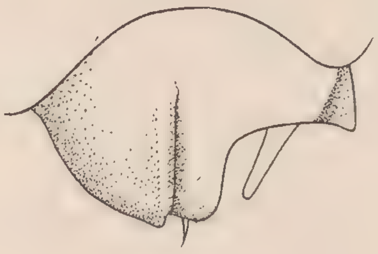

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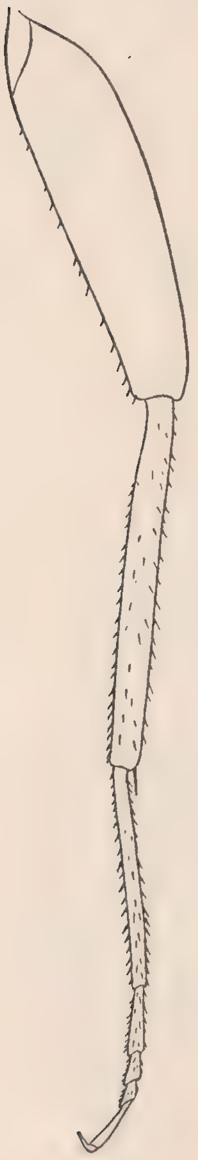

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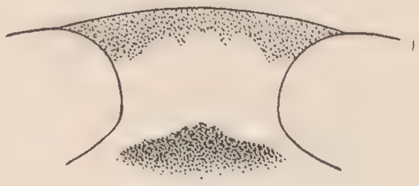

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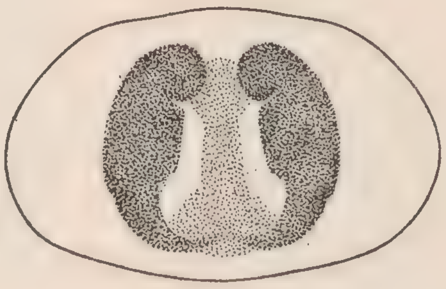

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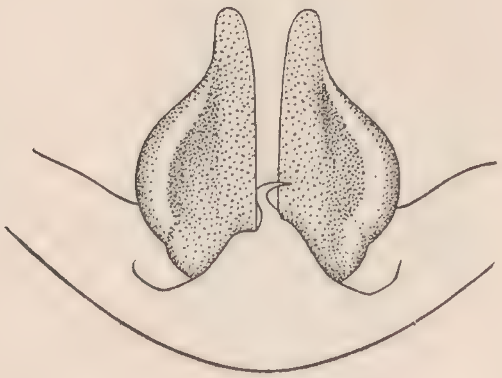

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PLATE XXI

Fig. 1. *Plectoptera porcellana* (Saussure). Dorsal view. Male. Cayamas, Oriente, Cuba. (×8½.)

Fig. 2. *Plectoptera porcellana* (Saussure). Dorsal view. Male. Cayamas, Oriente, Cuba. (×8½.)

Fig. 3. *Plectoptera porcellana* (Saussure). Dorsal view. Female. Cayamas, Oriente, Cuba. (×8½.)

Fig. 4. *Plectoptera porcellana* (Saussure). Dorsal view. Female. Cayamas, Oriente, Cuba. (×8½.)

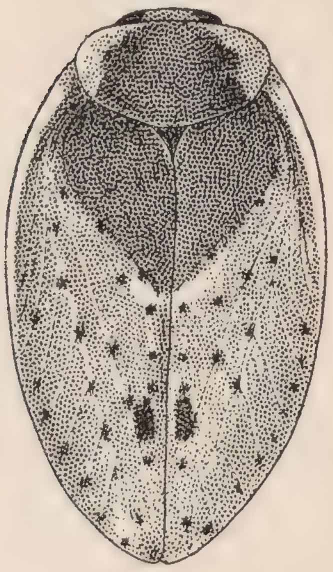
Fig. 5. *Plectoptera dorsalis* (Burmeister). Dorsal view. Male. Aibonito, Porto Rico. (×8.)

Fig. 6. *Plectoptera pygmæa* (Beauvois). Dorsal view. Male. Stony Hill, Jamaica. (×8.)

Fig. 7. *Plectoptera pygmæa* (Beauvois). Dorsal view. Female. Montego Bay, Jamaica. (×8.)

Fig. 8. *Plectoptera rhabdota*, new species. Dorsal view. Male (type). San Juan, Porto Rico. (×8.)

Fig. 9. *Plectoptera rhabdota*, new species. Dorsal view. Female (allotype). Aibonito, Porto Rico. (×8.)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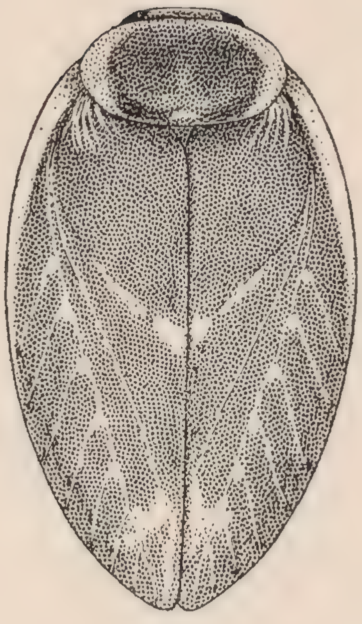
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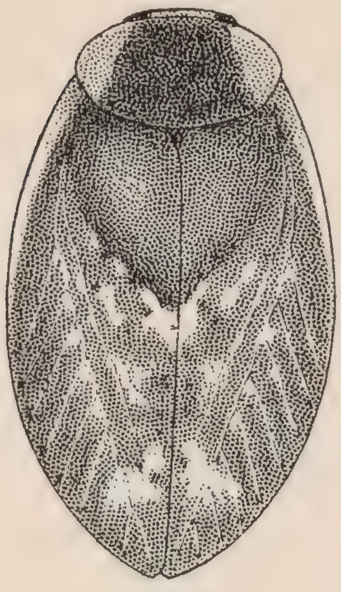
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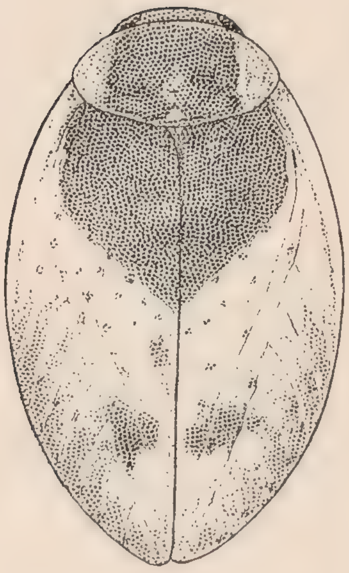
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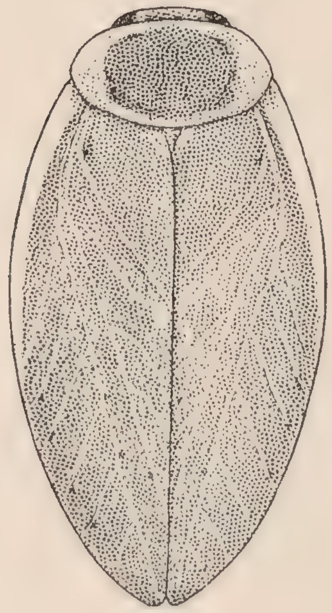
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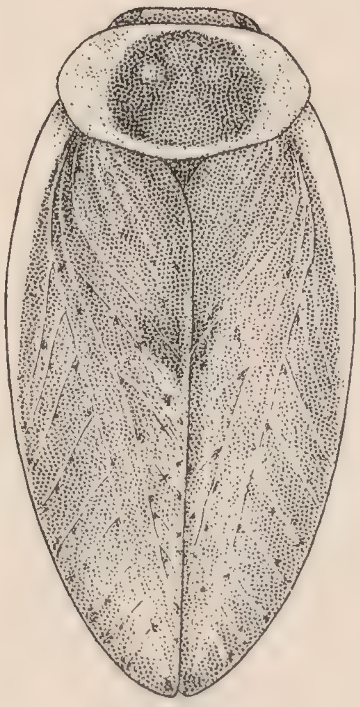
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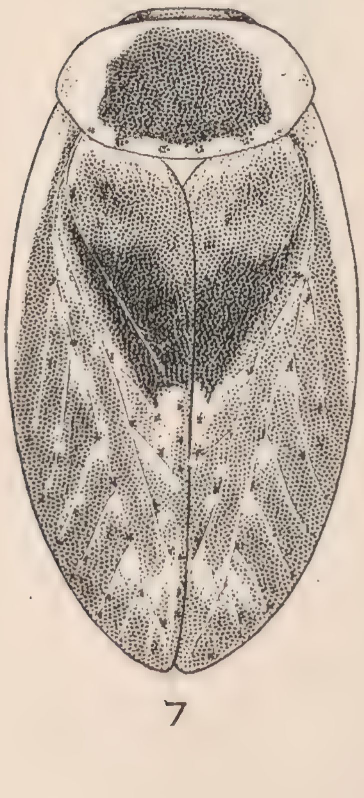
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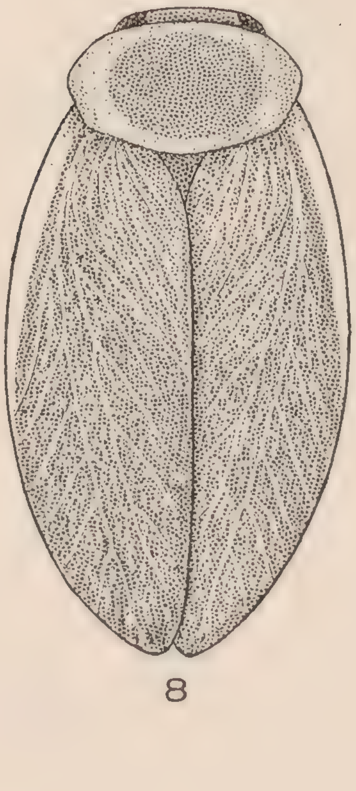
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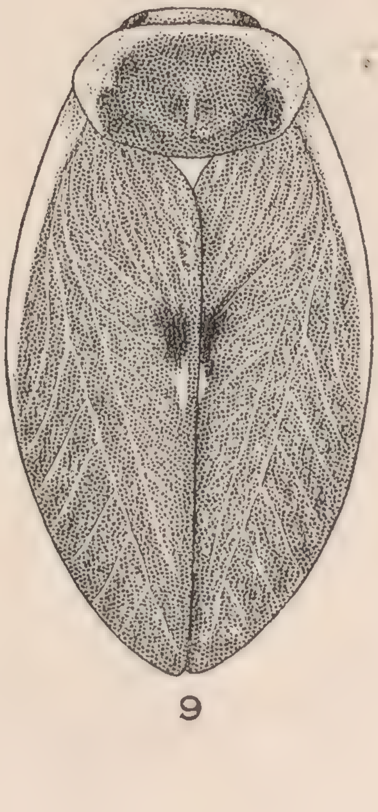
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PLATE XXII

Fig. 1. *Plectoptera perscita*, new species. Dorsal view. Male (type). Laudet, Dominica. (×8.)

Fig. 2. *Plectoptera vermiculata*, new species. Dorsal view. Male (type). Cayamas, Oriente, Cuba. (×8½.)

Fig. 3. *Plectoptera lacerna*, new species. Dorsal view. Male (type). Merceditas, north of Viñales, Pinar del Rio, Cuba. (×8½.)

Details of areolate pattern of representative sections of tegmina embracing discoidal and median veins, briefly proximad of middle of tegmen. (Greatly enlarged.)

Fig. 4. *Plectoptera porcellana* (Saussure). Male. Cayamas, Oriente, Cuba.

Fig. 5. *Plectoptera porcellana* (Saussure). Female. Cayamas, Oriente, Cuba. [Specimen figured in Plate XXI, figure 3.]

Fig. 6. *Plectoptera porcellana* (Saussure). Female. Cayamas, Oriente, Cuba. [Specimen figured in Plate XXI, figure 4.]

Fig. 7. *Plectoptera dorsalis* (Burmeister). Male. Aibonito, Porto Rico. [Specimen figured in Plate XXI, figure 5.]

Fig. 8. *Plectoptera pygmæa* (Beauvois). Female. Montego Bay, Jamaica. [Specimen figured in Plate XXI, figure 7.]

Fig. 9. *Plectoptera rhabdota*, new species. Male (type). San Juan, Porto Rico. [Specimen figured in Plate XXI, figure 8.]

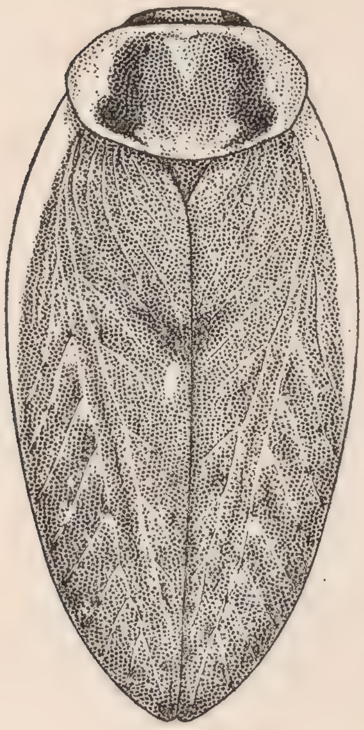
Fig. 10. *Plectoptera perscita*, new species. Male (type). Laudet, Dominica. [Specimen shown in figure 1 on this plate.]

Fig. 11. *Plectoptera vermiculata*, new species. Male (type). Cayamas, Oriente, Cuba. [Specimen shown in figure 2 on this plate.]

Fig. 12. *Plectoptera lacerna*, new species. Male (type). Merceditas, north of Viñales, Pinar del Rio, Cuba. [Specimen shown in figure 3 on this plate.]

Fig. 13. *Plectoptera dorsalis* (Burmeister). Pattern of ventral surface of subgenital plate of female. Mayaguez, Porto Rico. (Greatly enlarged.)

Fig. 14. *Plectoptera dorsalis* (Burmeister). Pattern of ventral surface of subgenital plate of female. Mayaguez, Porto Rico. (Greatly enlarged.)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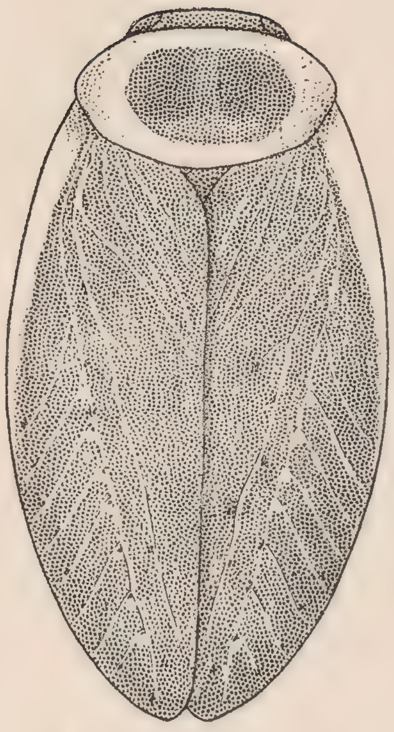
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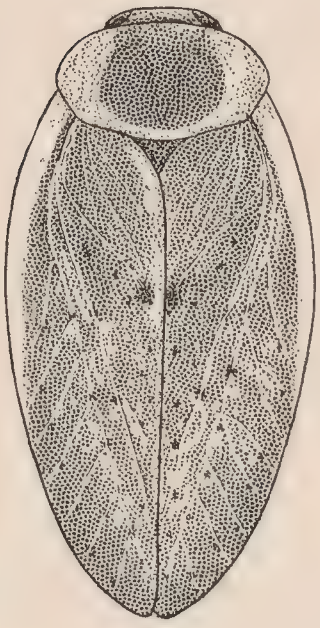
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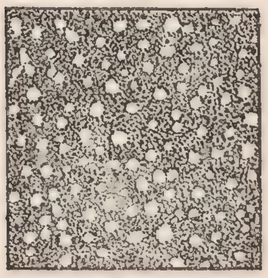
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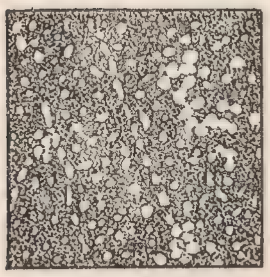
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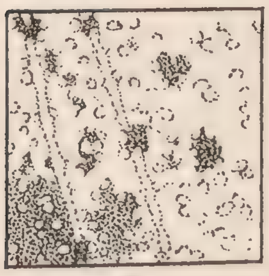
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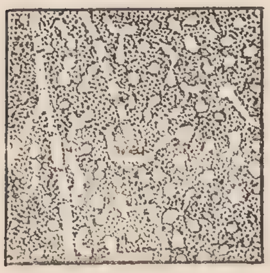
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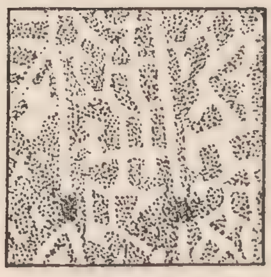
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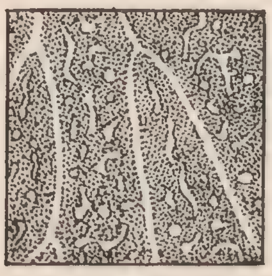
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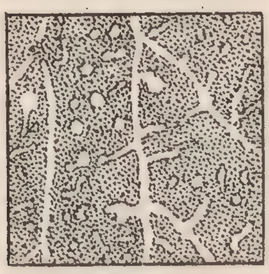
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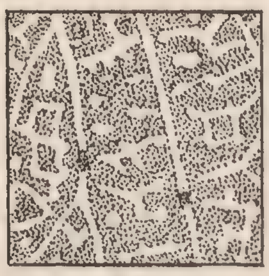
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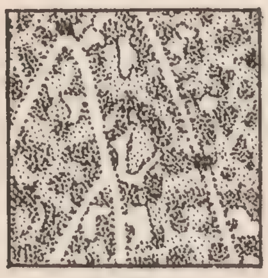
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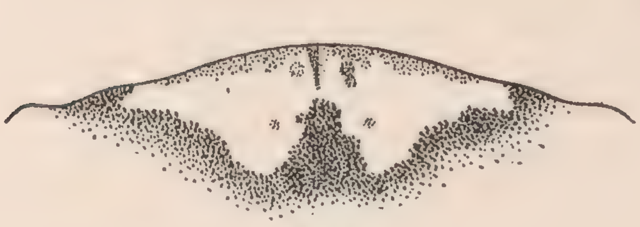
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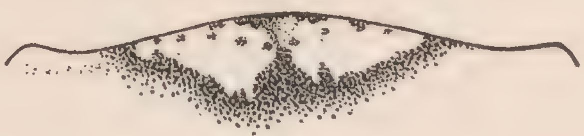
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Plate XXIII

Outline of distal margin of ventral surface of subgenital plate and styles of males. (Greatly enlarged.)

Fig. 1. *Plectoptera porcellana* (Saussure). Cayamas, Oriente, Cuba. [Specimen figured in Plate XXI, figure 1.]

Fig. 2. *Plectoptera porcellana* (Saussure). Cayamas, Oriente, Cuba.

Fig. 3. *Plectoptera porcellana* (Saussure.) Cayamas, Oriente, Cuba.

Fig. 4. *Plectoptera dorsalis* (Burmeister). Arecibo, Porto Rico.

Fig. 5. *Plectoptera dorsalis* (Burmeister). Aibonito, Porto Rico.

Fig. 6. *Plectoptera pygmæa* (Beauvois). Stony Hill, Jamaica. [Specimen figured in Plate XXI, figure 6.]

Fig. 7. *Plectoptera rhabdota,* new species. Type. San Juan, Porto Rico. [Specimen figured in Plate XXI, figure 8.]

Fig. 8. *Plectoptera perscita,* new species. Type. Laudet, Dominica. [Specimen figured in Plate XXII, figure 1.]

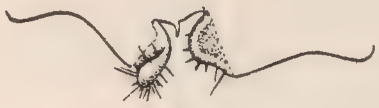
Fig. 9. *Plectoptera vermiculata,* new species. Type. Cayamas, Oriente, Cuba. [Specimen figured in Plate XXII, figure 2.]

Fig. 10. *Plectoptera lacerna,* new species. Type. Merceditas, north of Viñales, Pinar del Rio, Cuba. [Specimen figured in Plate XXII, figure 3.]

Fig. 11. *Plectoptera infulata,* new species. Type. Mayaguez, Porto Rico.

Fig. 12. *Plectoptera dominicæ,* new species. Type. Laudet, Dominica.

Fig. 13. *Plectoptera dominicæ,* new species. Dorsal outline of pronotum. Male (type). Laudet, Dominica. (X12.)



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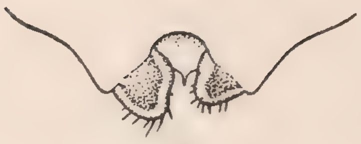

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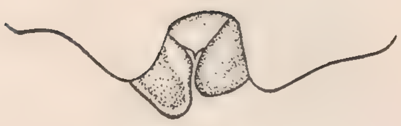

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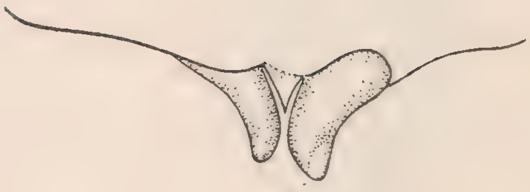

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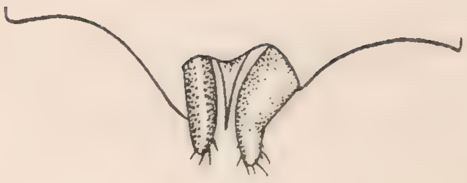

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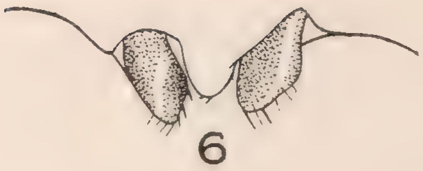

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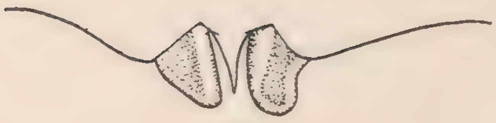

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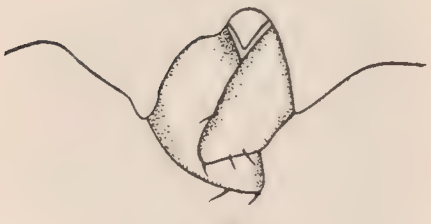

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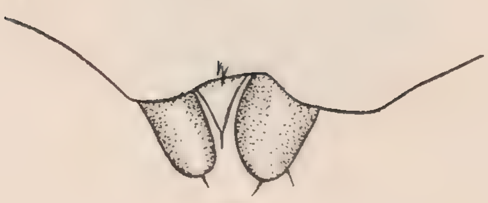

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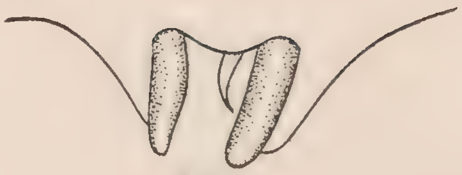

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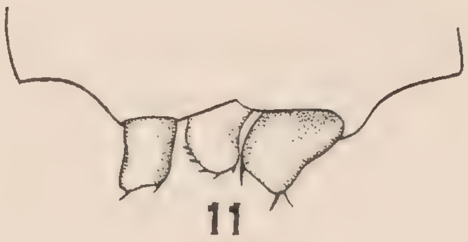

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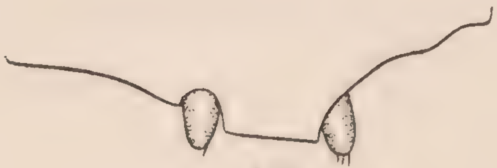

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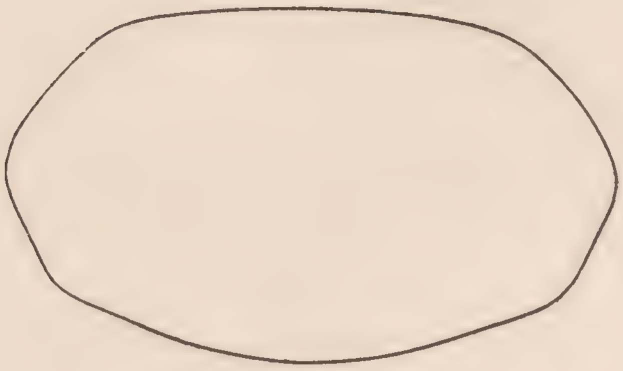

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Plate XXIV

Fig. 1. *Byrsotria cabreræ*, new species. Dorsal view. Male (type). Gibara, Oriente, Cuba. (Natural size.)

Fig. 2. *Byrsotria cabreræ*, new species. Dorsal view. Female (allotype). Gibara, Oriente, Cuba. (Natural size.)

Fig. 3. *Byrsotria fumigata* (Guérin). Dorsal outline. Male. Cabana, Havana, Cuba. (Natural size.)

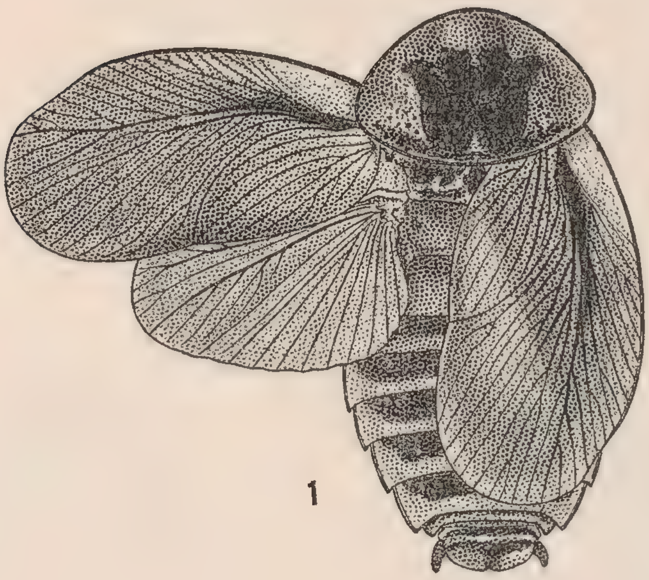
Fig. 4. *Poroblatta rufipes* (Brunner). Dorsal view. Male. Union, Castries, St. Lucia. (×2.)

Fig. 5. *Poroblatta rufipes* (Brunner). Outline of dorsal aspect of apex of abdomen of male. Union, Castries, St. Lucia. (×4.)

Fig. 6. *Poroblatta rufipes* (Brunner). Ventral aspect of subgenital plate of male. Union, Castries, St. Lucia. (Greatly enlarged.)

Fig. 7. *Chorisoneura formosella*, new species. Pattern of pronotum. Female (type). Between Pleasant Hill and St. Helens Gap, Jamaica. (×11.)

Fig. 8. *Chorisoneura formosella*, new species. Pattern of interocular portion of head. Female (type). Between Pleasant Hill and St. Helens Gap, Jamaica. (Greatly enlarged.)



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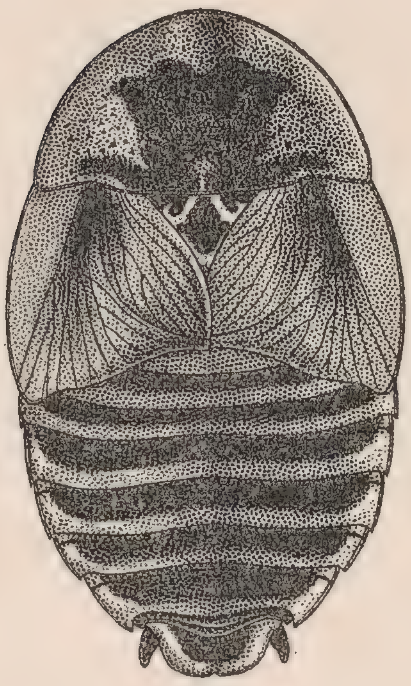

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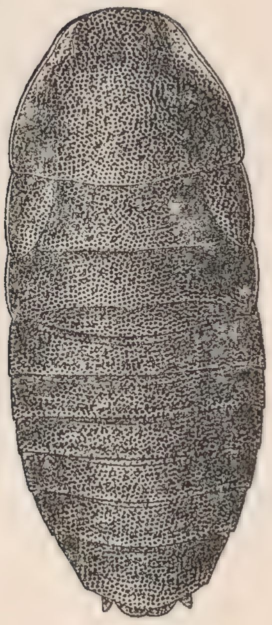

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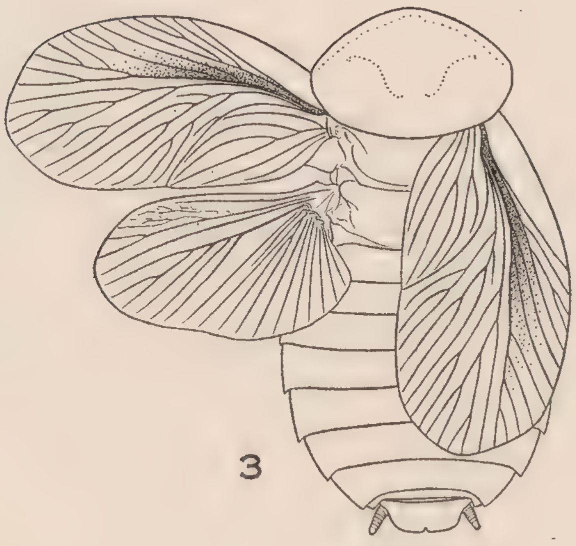

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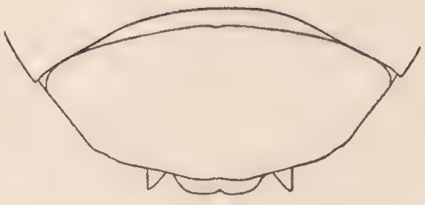

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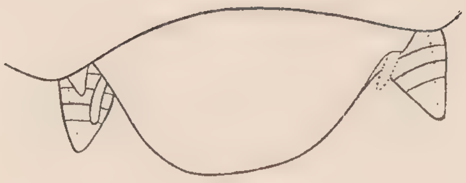

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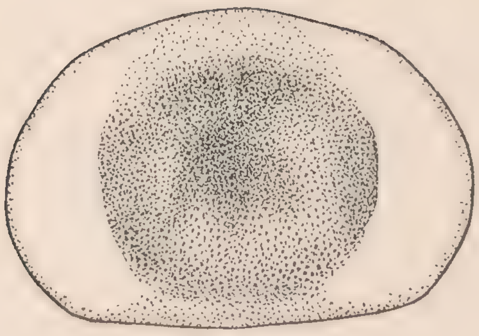

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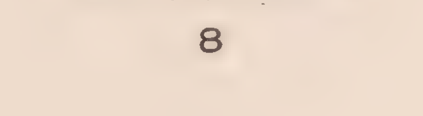

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Plate XXV

Fig. 1. *Epilampra haitensis*, new species. Dorsal view. Male (type). Port-au-Prince, Haiti. (×2½.)

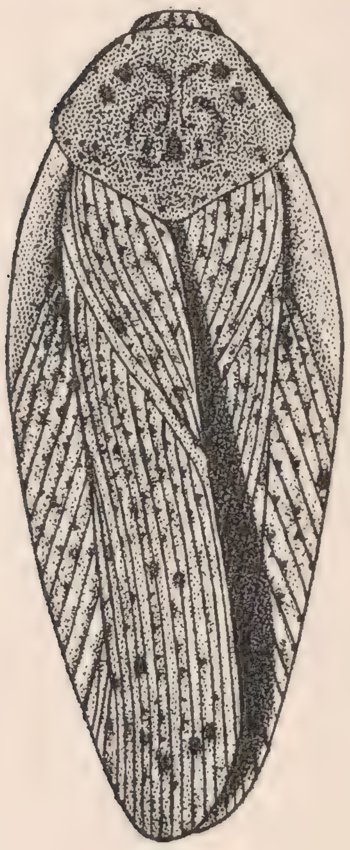
Fig. 2. *Epilampra haitensis*, new species. Pattern of interocular region and upper face. Male (type). Port-au-Prince, Haiti. (Greatly enlarged.)

Fig. 3. *Epilampra haitensis*, new species. Pattern of distal section of venter of abdomen. Male (type). Port-au-Prince, Haiti. (Enlarged.)

Fig. 4. *Epilampra sabulosa* Walker. Dorsal view. Male. Bourbon, Haiti. (2½.)

Fig. 5. *Epilampra sabulosa* Walker. Pattern of interocular region and face. Male. Bourdon, Haiti. (Greatly enlarged.)

Fig. 6. *Epilampra sabulosa* Walker. Pattern of distal section of venter of abdomen. Male. Bourdon, Haiti. (Enlarged.)



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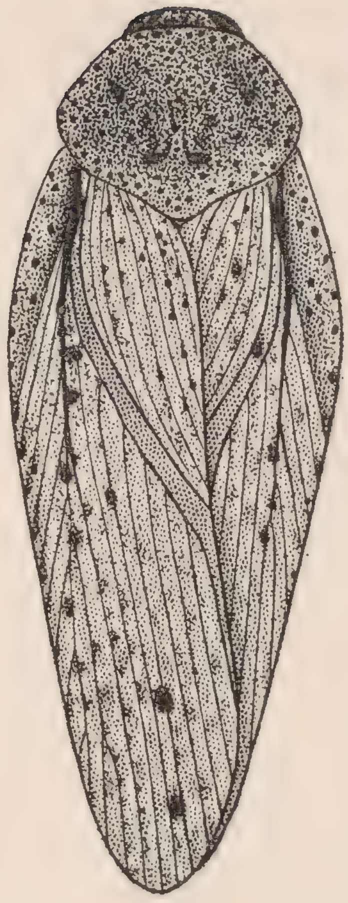

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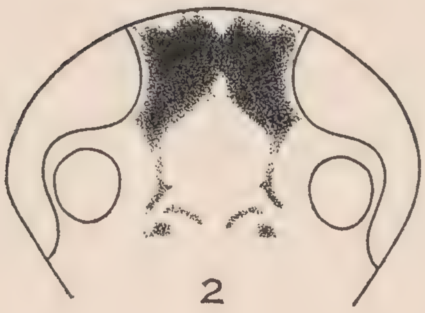

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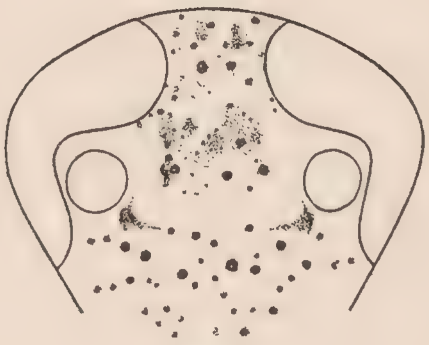

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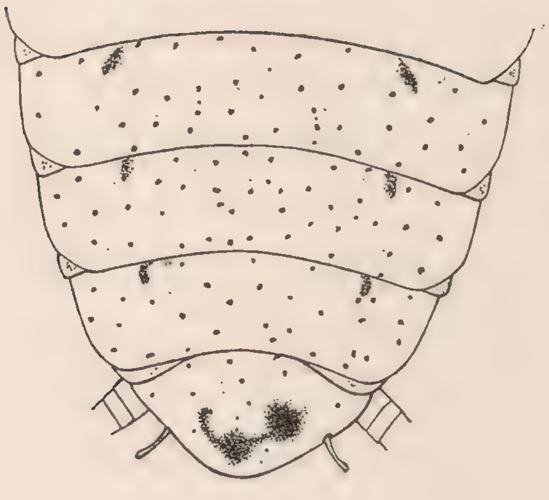

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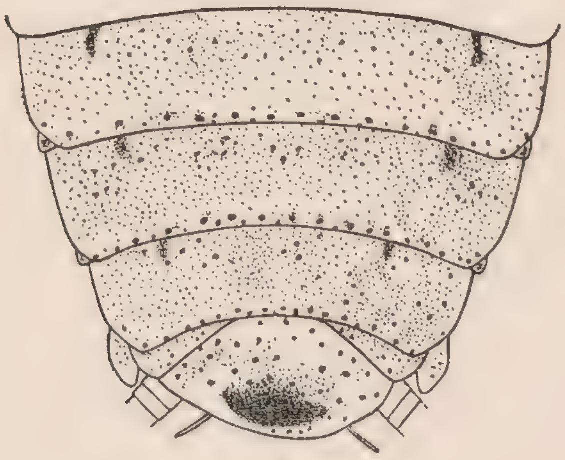

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Article II.—THE FISHES OF HAINAN[1]

BY JOHN T. NICHOLS AND CLIFFORD H. POPE[2]

PLATE XXVI, TEXT FIGURES 1 TO 51

INTRODUCTION

Prior to the work of The American Museum of Natural History's Asiatic Expeditions, the fresh-water fishes of Hainan Island off the coast of south China were very little known. Boulenger has reported on a collection of five species obtained in the interior of the island by Mr. John Whitehead, who died in Hainan in 1899 after a short stay there. (Proc. Zoöl. Soc. London, 1899, pt. 2, pp. 959–961, Pl. LXVIII and LXIX). Three of the five he lists as new, referring the other two respectively to a Burmese and Japanese species. Our Hainan collection contains the last-mentioned form, a *Zacco* which we have no hesitation in separating from Japanese species, though they are close; and we have some doubt in following Boulenger in the identification of his Hainan *Garra* with one from Burma.

The extensive collection on which the present paper is based was made in the vicinity of Nodoa in the late winter of 1922–1923 and spring of 1923 by C. H. Pope. Nodoa is situated in a foothill region where both swift-water (mountain) and sluggish-water (plains) fishes were to be met with, and, although from but a single locality, the forty-nine species probably give a very fair idea of the fishes of the island. Bearing this in mind, as also the size and isolation of Hainan and its large percentage of endemic fresh-water fishes, we have drawn up this paper in the form of an account of the fishes of Hainan, rather than merely a report on our collection as would have been appropriate for material of similar extent from some point on the mainland of China, for instance on the Yang-tze. Of the small number of forms in Hainan from the mainland of China, most are common or widely distributed—for instance, the carp, goldfish, japanese eel "monopterus," snakeheads (*Ophicephalus maculatus* and *gachua*), *Channa* paradise fish, and *Barbus semifasciolatus*, the two latter species commonly kept in aquaria. Perhaps some of the supposedly endemic species will prove to be identical with species in Indo-China and Malay, with the fishes of which region the authors are much less familiar than with those of China proper. The *Parasilurus* is identified with *P. cochinchinensis*, an *Acanthorhodeus* with *A. tonkinensis* (close to *A. guichinoti*), both southern representatives of species abundant in central China. We find no endemic fresh-water genera in Hainan.

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[1] Publications of the Asiatic Expeditions of The American Museum of Natural History. Contribution No. 72.

[2] The colored plate is by Mr. Wong of Pekin; the line drawings are by Miss Olive Otis.

Since the completion of this paper Oshima (1926) has reported on a collection of fresh and brackish water fishes from Hainan, describing several new species and listing a number not previously recorded from the island. As it is not our purpose to include brackish water forms with marine affinities, or marine forms the occurrence of which in fresh water is fortuitous, the following (mostly from Haiho) have not been included.

Elops saurus, *Harengula fimbriata*, *Anodontosoma chacunda*, *Dorosoma nasus*, *Clupanodon haihoensis* Oshima (1926), *Mugil carinatus*, *M. nepalensis*, *Caranx forsteri* (Haiho, and also Kachek River), *Sparus datnia*, *Gerres punctatus*, *G. poeti*, *G. limbatus*, *Bostrichthys sinensis*, *Apocryptes maculatus* Oshima (1926), *Rhinogobius punctatus* Oshima (1926, Haiho), *Boleophthalmus chinensis*.

Of two new genera which Oshima proposes, the one, *Spinibarbichthys*, our view would not admit to generic rank, the other, *Carassioides*, we suspect of being the hybrid between carp and goldfish for which generic and specific names were already available.

It is a (necessary) pleasure to use Oshima's names for 3 new forms which we also had to hand from the vicinity of Nodoa, one of his we think we have identified with *Acanthorhodeus tonkinensis* from the mainland, and 1 or 2 of ours which he seemingly had but failed to differentiate from known species, we are not yet prepared to relinquish.

The ichthyological work of the Third Asiatic Expedition in Hainan extended over a period of eight months, beginning December 1922 and ending July 1923. Most of the fish were taken in the early spring, for at that time the streams were low and the fish forced to gather in isolated or barely connected pools.

Nodoa was the center of activity, as all of our specimens were secured within fifteen miles of this town, the vast majority having been taken from water in its immediate vicinity. Nodoa's location is an especially good one for it lies in the hilly, rolling country of the area intermediate between Hainan's northern plain and central highland. This market town is slightly nearer the island's center than its northwestern coast and about forty miles from the famous Five Finger Mountains. A distance of ten miles directly north brings one out on the low plain, while the wildest section of the highland is only twenty miles to the southwest.

The fishes recorded herein as having been caught in the "immediate vicinity" of Nodoa were taken from one of the following sources:

ricefield irrigation ditches and reservoirs; or sluggish streams rising in the lower foothills; or a small river which, though rising in the foothills, flows for some miles down a series of cascades.

All specimens were secured first-hand or directly from fishermen. For more than three months natives were paid to fish the waters about Nodoa using their own nets. Such methods, while more or less primitive, in the long run yield excellent results. Many rare forms may be secured in this way. More drastic methods were employed when the headwaters of the Golden River were investigated for river and mountain forms. This, the island's largest river, flows within five miles of Nam Fong, which is itself only ten miles south of Nodoa.

It should be noted that our collecting was entirely confined to fresh waters and that most of our fishing was done in streams, pools, and ditches. Hainan is only a small island and its fresh waters are not extensive.

The authors fully realize that this work could never have been carried on had it not been for the hospitality, generosity, and continued help rendered by the members of the Nodoa Station of the American Presbyterian Mission, Hainan. This opportunity is taken to express deepest gratitude for assistance so graciously rendered.

A small stream rises just northeast of Nodoa in low, rolling country. For about two miles it is little more than a series of shallow, barely connected, grass-grown pools crowded by ricefields. In its third mile it picks up and begins to flow through the dense vegetation that crowds its bed of solid rock. Now and then it forms an open pool comparatively free of vegetation. We selected one of these in the third mile and one of the lagoon-like, grassy pools of the second mile and made an investigation of the fish life of each, the results of which are set down below.

The open, basin-like pool in the third mile of the stream's course was partly shaded, circular, 150 feet in diameter, 4 to 8 deep, and has a gravel bottom. The borders and bottom are practically free of vegetation. There are no overhanging banks. Our fairly clean sweep of the fishes of this pool was made late in February before they had been scattered by the spring rains. Twelve hundred and fifty-nine specimens were counted as follows:

Ischikauia hainanensis........................	665	examples
Osteochilus salsburyi,........................	222	"
Acanthorhodeus tonkinensis....................	160	"
Pseudoperilampus hainanensis..................	76	"
Carassius auratus.............................	47	"

Barbus semifasciolatus	37	examples
Hemibarbus and Pseudogobio	25	"
Hemiculter hainanensis	19	"
Barbus nigrodorsalis	2	"
Cobitis tænia dolichorhynchus	1	"
One species uncertain	5	"

The grass-grown, partly-shaded, lagoon-like pool in the second mile of the stream's course was murky and wedged in between ricefields. It had a sand and mud bottom, was three to five feet deep, a hundred yards long by ten wide, and one of its banks was densely overgrown and overhanging. Probably we missed many catfish and examples of *C. t. dolichorhynchus* (later on with a net we got many examples of the latter in this same pool). Twelve hundred and seventy specimens were counted as follows:

Barbus semifasciolatus	520	examples
Acanthorhodeus tonkinensis	394	"
Ischikauia hainanensis	160	"
Pseudoperilampus hainanensis	86	"
Osteochilus salsburyi	34	"
Carassius auratus	30	"
Four species uncertain	46	"

The following species were constantly taken in the immediate environs of Nodoa.

Fluta alba xanthognatha
Clarias fuscus
Parasilurus cochinchinensis
Pseudobagrus virgatus
Cobitis tænia dolichorhynchus
Misgurnus mizolepis hainan
Nemacheilus pulcher
Cyprinus carpio
Carassius auratus
Barbus nigrodorsalis
Barbus semifasciolatus
Osteochilus salsburyi
Hemibarbus labeo
Pseudogobio labeoides
Zacco asperus
Opsariichthys hainanensis
Ischkauia hainanensis
Magalobrama melrosei
Hemiculter hainanensis
Rasborinus hainanensis
Aphyocypris normalis
Acanthorhodeus tonkinensis

Pseudoperilampus hainanensis
Aplocheilus curvinotus
Ophicephalus maculatus
Channa ocellata
Macropodus viridiauratus
Philypnus chalmersi
Gobius hadropterus

Four species, as follows, were not taken in the mountains and were only very rarely found near Nodoa:

Anguilla japonica
Garra schismatorhyncha
Sarcocheilichthys hainanensis
Hemiculter serracanthus

The following three fishes were apparently confined to the higher mountain streams some miles south of Nodoa.

Glyptosternon hainanensis
Gastromyzon leveretti
Cyclocheilichthys iridescens

Several species were taken in the Golden River at its point of emergence from the mountains five miles southeast of Namfong. As the lower reaches of the river were not fished, we do not know how generally they are distributed down stream. Such are:

Barbus denticulatus
Barbus barbodon
Varicorhinus discognathoides
Onychostoma leptura
Labeo collaris
Erythroculter pseudobrevicauda

ELOPIDÆ. The Tarpons

Herring-like fishes with large mouth, projecting lower jaw, lateral line, and no ventral keel.

MEGALOPS Lacépéde

LACÉPÈDE, 1803, 'Hist. Nat. Poiss.,' V, p. 289. Type *Megalops filamentosus* Lacépède = *Clupea cyprinoides* Broussonet.

Large compressed fishes with large silvery scales, running into fresh water from the sea. The dorsal fin with its last ray produced.

Megalops cyprinoides (Broussonet)

Clupea cyprinoides BROUSSONET, 1782, Ichthyologia, I, Pl. IX.

Depth, in length to base of caudal, about 3.5; head, about 3.5. Eye in head 3.2 to 3.5; snout, and interorbital, about 6.5. Dorsal rays 19 to 21; anal 24 to 27. Scales in lateral line 37 to 42.

Recorded by Oshima (1926) from Haiho, Hainan.

ANGUILLIDÆ. The True Eels

ANGUILLA Shaw

SHAW, 1803, 'General Zoology or Systematic Natural History,' IV, p. 15. Type: *Anguilla vulgaris.*

This genus is distinguished from its relatives by the presence of small, embedded, linear scales placed in groups, those of one group at right angles to those of adjoining groups. Its species are indifferently coastal or fresh-water and retire to the deeps of ocean basins under the warm water of the open sea to spawn. The young pass through a flat, translucent, pelagic, larval stage. The common fresh-water eel of Japan (and of China) is very like that of Europe and that of the Atlantic slope in America.

Anguilla japonica Temminck and Schlegel

Anguilla japonica TEMMINCK AND SCHLEGEL, 1847, p. 258, Pl. CXIII, fig. 2.

But a single specimen of *Anguilla,* which is common in the Yang-tze, was obtained at Hainan. It was this species.

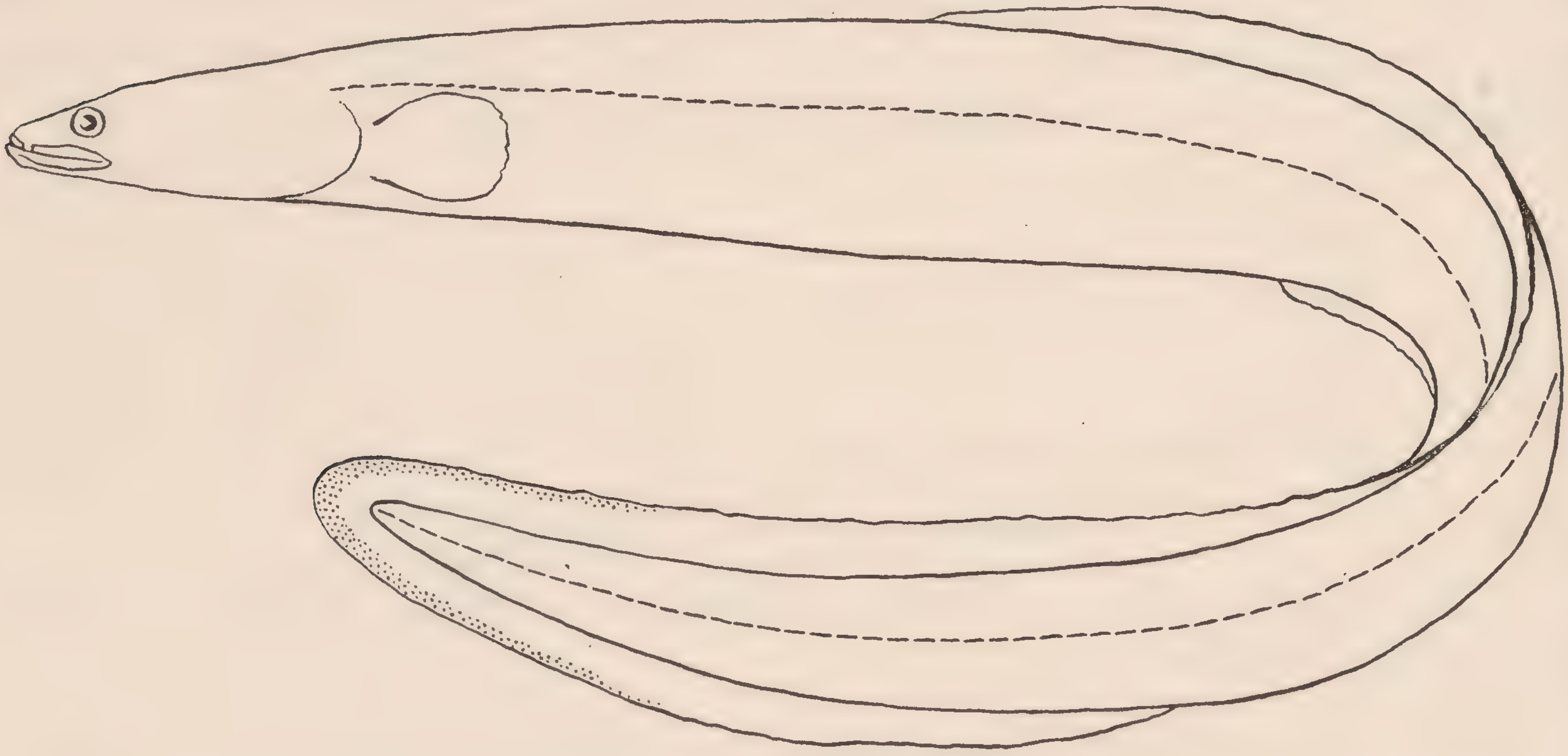

Fig. 1. *Anguilla japonica* Temminck and Schlegel. 440 mm. without caudal.

Length to base of caudal 440 mm. Head in length 7.9, tail 1.7. Depth in head 2; snout 5.3; maxillary 3.4; pectoral 3. Eye in snout 3. Anal origin behind dorsal origin a distance contained 1.2 in head.

Body little compressed, snout depressed, tail compressed. Dorsal beginning far behind head. Lower jaw projecting, lips fleshy; maxillary extending to beyond eye

Olivaceous, belly abruptly pale, caudal and posterior dorsal and anal dusky edged.

For comparison, a specimen 345 mm. in length to base of caudal, Tung-ting Lake, Hunan, December 9, 1921, is as follows. Head in length 8.4; tail 1.6. Depth in head 2.5; snout 5; maxillary 3.1; pectoral 3. Eye in snout 3. Cylindrical, snout depressed; tail somewhat compressed. Anal origin behind that of dorsal a distance contained 2.5 in head, considerable divergence here likely individual or age variation.

We unhesitatingly refer the Hainan specimen to *Anguilla japonica*, to which Oshima (1919, Annals. Carn. Mus.) refers the common Formosan form, and doubt the distinctness of *Anguilla sinensis* McClelland (1844, Calc. Jour., IV, p. 406, China) to which the Tungting specimen should belong.

My Hainan fishermen caught only one specimen of *Anguilla*, and insisted that it was not only the rarest but most delicious "fish" found about Nodoa.

Anguilla mauritiana Bennett

Anguilla mauritiana Bennett, 1831, Proc. Comm. Zool. Soc., p. 128. Mauritius.

East Indian oceans and archipelagoes in general, recorded by Oshima (1926) from the Kachek River, Hainan. Irregularly spotted with blackish; the dorsal origin more anterior than in *A. japonica*, nearer to the pectoral than to the anal origin.

SYMBRANCHIDÆ. Symbranch Eels

Slender, scaleless, more or less finless fresh-water eels of southern Asia and the Indies and tropical America. The gill openings are joined on the under surface of the head to form a single cleft. A few, sometimes very wide-ranging species.

FLUTA Bloch and Schneider

Bloch and Schneider, 1801, 'Systema Ichthyologiæ,' p. 525. Type: *Monopterus javanensis* Lacépède = *Fluta alba* (Zuiew).

Fluta alba (Zuiew)

Muraena alba Zuiew, 1793, Nova Acta, Acad. Sc. Petropol., VII, p. 299.

The *Fluta* from Hainan may be differentiated from that found in the Yang-tze basin (*Fluta alba cinerea*) by shorter tail, smaller eye, and higher, more gibbous nape. None of our fourteen Hainan specimens (172 to 455 mm. in total length) show the rather bold, blackish spotting frequently found in *cinerea*. They have head in length to vent 8.1 to 10.3 (average 9.5); tail from vent 2.5 to 3.3 (average 2.9); eye in snout 1.7 to 3 (average 2.3), with tendency to decrease of size of eye, slight decrease of length of tail and increase of length of head with increase of size. The eye is about one-half the snout at 200 mm. total length, about one-third at 400 mm.

Fluta alba xanognatha (Richardson)

Monopterus xanthognathus Richardson, 1844, 'Voyage of the Sulphur,' p. 118, Pl. lii, Canton.

Description of a specimen taken March 30, 1923 at Nodoa:

Total length 174 mm. Head (to posterior angle gill-opening) 12.4 in length; tail from vent 4.1. Depth in head 2.2; gape (snout to angle mouth) 2.4; snout 4.4; maxillary 2.3; distance between posterior corners of gill slit 3.4. Eye in snout 2.1; width lower lip 2; interorbital 1.7. Snout bluntly pointed; lower jaw slightly included; eye small, beneath skin, over middle of mouth; gill opening ventral, V-shaped, angle of the V somewhat less than a right angle. Body cylindrical, slightly deepest at shoulder, without fins or ridges; tail compressed, tapering, a low keel along three quarters of its upper and two thirds of its lower edge; profile of head low, slightly concave over the eye and convex at nape. Color uniform ash-gray. A color sketch from life is dusky olive above, finely freckled with blackish; bright orange band below; dusky mark downward and backward of the eye.

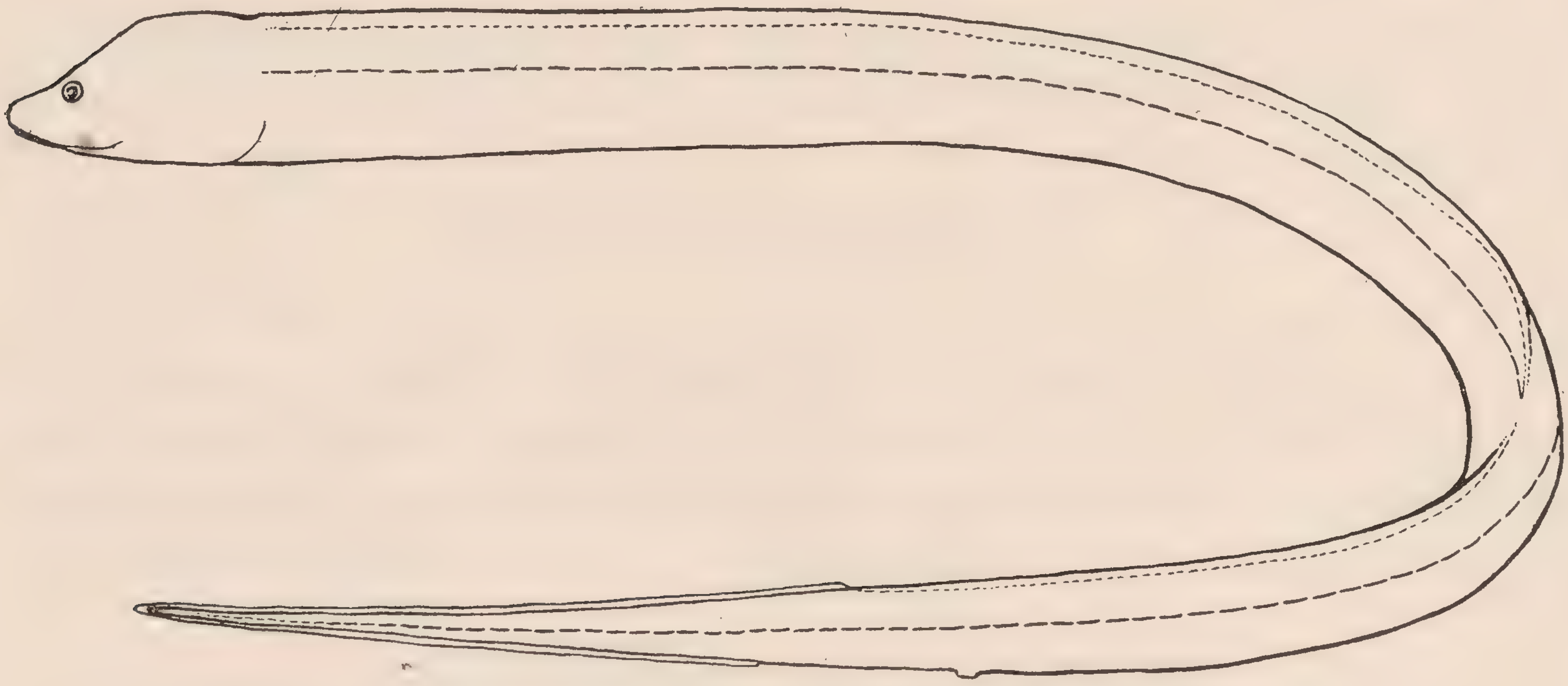

Fig. 2. *Fluta alba xanthognatha* (Zuiew). 395 mm. total.

Siluridæ. Catfishes

Scaleless fishes, ordinarily with a transverse, more or less terminal mouth surrounded by several pairs of conspicuous barbels. Dorsal and pectoral fins each with a spine, frequently serrate, more or less developed or absent. When the dorsal is short there is usually an adipose fin situated more posteriorly on the back. Catfishes are scarce in Europe and northern Asia, plentiful in southern Asia and eastern temperate America, abundant and varied in Africa, and perhaps reach their greatest development in tropical America, where there is a large, specialized, armored, offshoot family, the Loricariidæ. Catfishes are mostly inhabitants of fresh water; there are a few tropical or subtropical, marine coastwise genera.

Clarias Scopoli

Scopoli, 1777, following Gronow, 1763, 'Zoophylaceum,' p. 100. Type: *Clarias orontis* Günther.

Elongate catfishes; the dorsal, without spines, extending the length of the back, longer than the anal, which is also long. Top and sides of the head bony. Four pairs of barbels. Caudal truncate or rounded.

Clarias fuscus (Lacépède)

Macropteronotus fuscus Lacépède, 1803, V, p. 88, Pl. ii, fig. 2.
Clarias fuscus Günther, 1864, 'Cat.,' V, p. 18.

Description of a specimen taken February 21, 1923, at Nodoa:

Length to base of caudal 96 mm. Depth in length 5.4; head (to end of bony covering on side) 3.8. Eye in head 9; snout 3; interorbital 2; width of mouth 2.4; width of head 1.4; length of anterior foramen 4; posterior foramen 5; maxillary barbel 0.8; depth of peduncle 4; pectoral spine 2.5; ventral 2.6; caudal 1.8.

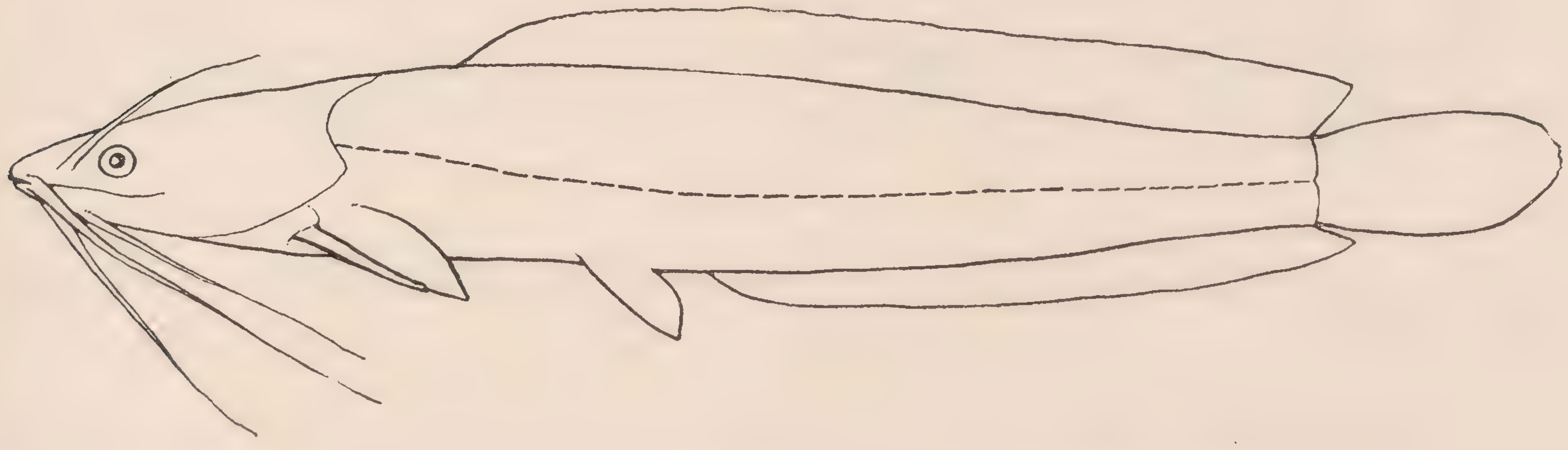

Fig. 3. *Clarias fuscus* (Lacépède). 76 mm. without caudal.

Dorsal about 60; anal about 50.

Head depressed; body compressed; belly flat. Whole top of head and nape smooth and bony beneath the skin, this carapace ending in a vertical limb on the sides, a wide-angled point in the center of nape (separated by an interval slightly less than snout from dorsal origin), and in a horizontal ridge or angle below eye; two well-marked foramina in the central line. Mouth wide, transverse, the upper jaw slightly the longer; lips, chin and flattened base of maxillary barbel papillose; a long barbel at posterior nostril, on maxillary, and two at the side of lower jaw; gill-membranes united at base, free from isthmus, the gill slit ending above at the bony carapace over pectoral base. Pectoral spine short and stout, roughened in front, smooth behind; ventrals passing anal origin; dorsal and anal rays obscure in the fleshy membrane of the fins; vertical fins adnate to caudal at base; anal origin equidistant from base of caudal and center of eye; caudal rather narrow, with straight sides, somewhat rounded behind.

Body and fins uniform dark slaty, paler on the belly. A color sketch from life is uniformly dusky body and fins; that of a smaller specimen dark purplish; the head and fins brownish; blackish horizontal streak below the eye and vertical streak at the base of the caudal.

Parasilurus Bleeker

Bleeker, 1862, Versl. Akad. Amsterdam, XIV, p. 394. Type: *Silurus japonicus* Temminck and Schlegel = *Silurus asotus* Linnæus.

Elongate catfishes with a very small spineless dorsal and no adipose; the anal very long more or less adnate to the subtruncate caudal; only two pairs of barbels.

Parasilurus cochinchinensis (Cuvier and Valenciennes)

Silurus cochinchinensis Cuvier and Valenciennes, 1839, XIV, p. 352, Cochin-China. Günther, 'Cat.,' V, p. 342.

Description of a specimen (Number 8359, American Museum of Natural History) from Nodoa, Hainan:

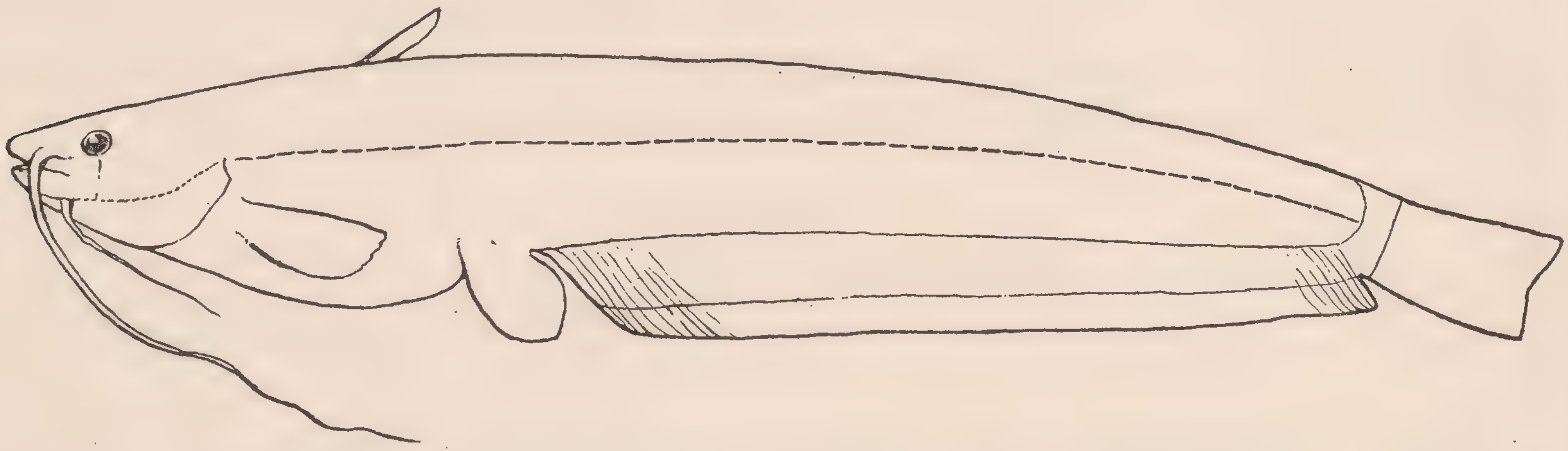

Fig. 4. *Parasilurus cochinchinensis* (Cuvier and Valenciennes). 145 mm. without caudal.

Length to base of caudal 125 mm. Depth in length 4.7; head 5.6. Eye in head 7.5; snout 2.7; interorbital 2.2; maxillary 2; width of mouth 2; maxillary barbel 0.4; width of head 1.4; depth of peduncle 3; pectoral 1.3; ventral 2; longest anal ray 1.7; dorsal 2; caudal 1.1.

Dorsal 5; anal 66.

Head a little depressed; body compressed, breast gibbous, rounded; ventral and anal bases close together. Mouth almost terminal, slightly inferior, wide, curved, transverse, with somewhat pimply lips; maxillary reaching to nearly under center of small eye; which has no trace of a free rim; interorbital broad, slightly convex; gill membranes joined at the base, free from isthmus; dorsal small, without a spine, over the end of pectoral; a little before ventral origin; pectoral spine short pungent concealed, about one-half the length of the fin; pectoral not quite to ventral, ventral reaching past front of anal; last anal ray joined to caudal base for about one-half its length; caudal obliquely subtruncate; very slightly emarginate; no adipose. A long maxillary and single mental barbel, the former reaching to front of anal, the latter to base of pectoral.

Marbled with blackish and paler; caudal and anal dark proximally of two lines which intersect at the tip of the notch between them. A number of specimens of which this is one of the smaller.

The slightly included lower jaw separates this species at once from the widely distributed *Parasilurus asotus* of North and Central China.

We find nothing in the Hainan fish to separate it from *cochinchinensis*, but have no material from Cochin-China, wherewith to compare it.

PSEUDOBAGRUS Bleeker

BLEEKER, 1860, Act. Soc. Sci. Indo-Neerl, VIII, p. 87. Type: *Bagrus aurantiacus* Schlegel.

Moderate or short-bodied catfishes, with four pairs of barbels; the dorsal short; anal of moderate length; caudal well forked; adipose moderate, much smaller than the anal; a strong spine in dorsal and pectoral; eye large or moderate, with a free or partially free rim.

Pseudobagrus intermedius, new species

Close to the widely distributed *Pseudobagrus fulvidraco;* intermediate between that species and one or more related ones on the mainland with short, slender barbels.

DESCRIPTION OF TYPE.—Number 8360, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 106 mm. Depth in length 4.4; head 3.4; Eye in head 5.4; snout 3; interorbital 3; maxillary 3.3; width of mouth 2.5; maxillary barbel 2; width of head 1.5; depth of peduncle 2.6; its length 2.5; dorsal spine 1.8; pectoral spine 1.4; ventral 2; longest anal ray 2.2; lower caudal lobe 1.4; length of adipose 1.9; dorsal interspace 1.2.

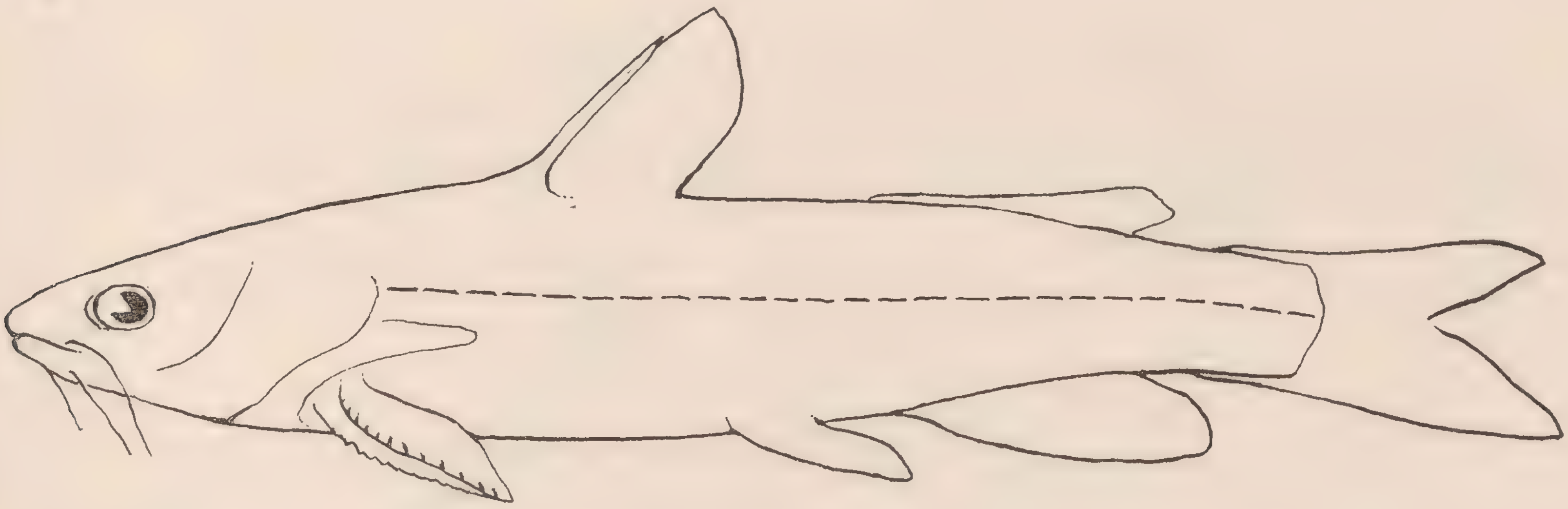

Fig. 5. *Pseudobagrus intermedius*, type. 106 mm., without caudal.

Dorsal I, 7; anal 20.

Snout depressed; body behind dorsal compressed; vent about half-way between ventral axil and anal origin. Interorbital flattish; a long depression in the center of the head; bones of the top of head rough striate, not or but thinly covered with skin; backward and forward processes narrowly meeting at nape to form a continuous bony bridge; mouth inferior, curved, with moderately thick slightly striate lips; maxillary reaching not quite to front of eye; barbels normally placed, weak and slender; orbital rim imperfectly free above and below, adnate before and behind; gill-membranes narrowly joined free from isthmus at base. Dorsal origin equidistant from snout and front part of anal or front of adipose; dorsal spine smooth before and behind;

pectoral spine barbed behind, finely serrate in front; both spines striate; a conspicuous rough naked scapular point above pectoral; pectoral not reaching ventral, ventral passing anal origin; caudal well forked, the lower lobe slightly the longer and much the broader.

A darker triangular area on side below dorsal, in front of which a pale band extends downward and forward, and behind which a pale band downward and backward; another slightly dark cross area covering the anterior three quarters of anal; nasal and maxillary barbels dark.

Pseudobagrus virgatus (Oshima)

Aoria virgatus Oshima, 1926, Annot. Zool. Japon., XI, p. 4, Kachek River, Hainan.

A small handsome species with round snout, large eye, and unusually sharply marked color pattern, apparently related to but distinct from *Pseudogabrus brachysoma* Günther from Cochin-China.

Description of a specimen (Number 8361, American Museum of Natural History). Locality: Nodoa, Hainan.

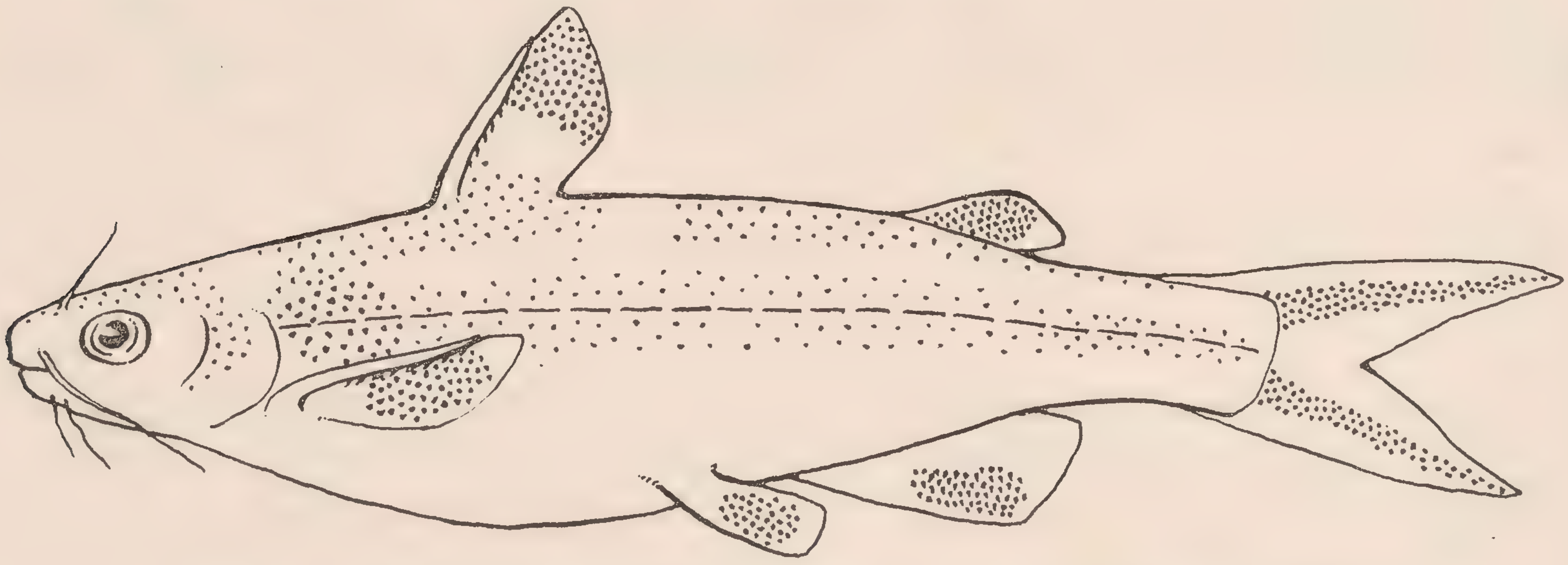

Fig. 6. *Pseudobagrus virgatus* (Oshima). 95 mm., without caudal.

Length to base of caudal 95 mm. Depth in length 3.3; head 3.9. Eye in head 3.8; snout 3; interorbital 2.8; width of mouth 3.4; depth of peduncle 2.2; its length 1.6; maxillary barbel 2; dorsal spine 1.5; pectoral spine 1.3; pectoral fin 1.1; ventral 1.7; longest dorsal ray 1.3; longest anal ray 1.8; caudal lobe 1.1; total length of adipose 1.6; same in dorsal intersapce 1.7.

Dorsal I, 7; anal 16.

Well compressed, profile low and slanting, belly rounded; snout blunt and soft; top of head covered with skin; occipital prolongation narrow and long meeting predorsal shield. Mouth inferior, transverse; maxillary not reaching eye; lips rather thick, striate; nostrils far apart; interorbital slightly convex; 4 barbels on each side, one at the front of the posterior nostril, one on maxillary, and two close together on either side of chin; barbels of moderate length and very slender; orbital rim imperfectly free above and in front where there is a deep fold, otherwise adnate; gill-membranes narrowly joined, free from isthmus at base. Dorsal and pectoral spines slender and strong with low barbs behind, smooth in front except one obscure barb near top of dorsal spine; shoulder spine above basal half of pectoral spine narrow, pointed, exposed, striate, the hollow below it sheathing the pectoral spine. Dorsal origin equidistant from tip of snout and anal origin; ventral origin well behind dorsal base; adipose axil slightly in advance of that of anal; ventrals short and broad, reaching front of anal; caudal well forked with pointed spreading lobes, and rudimentary basal rays keeled. Lateral line bowed slighly up before dorsal, otherwise straight, complete.

Top of dorsal, a large blotch on end of pectoral, another occupying most of the ventral with exception of its base; the adipose excepting its origin and margin, a blotch on the anterior anal rays, and center of caudal lobes black. Vague faint dark shading along the back, broken behind dorsal; and in a band on side from shoulder to base of caudal; otherwise dull pinkish, the fins somewhat yellowish.

GLYPTOSTERNON McClelland

McCLELLAND, 1842, Journ. Nat. Hist. Calcutta, II, p. 584. Type: *Glyptosternon reticulatus* McClelland.

This genus differs conspicuously from *Pseudobagrus* in that the eye is small, more superolateral, without a free rim; the anal is shorter, its base scarcely longer than that of the adipose; the basal portion of the maxillary barbel is furnished with a conspicuous membranous flap adnate to the side of the snout.

Glyptosternon hainanensis, new species

A small *Glyptosternon* with dark spot across each of several fins.

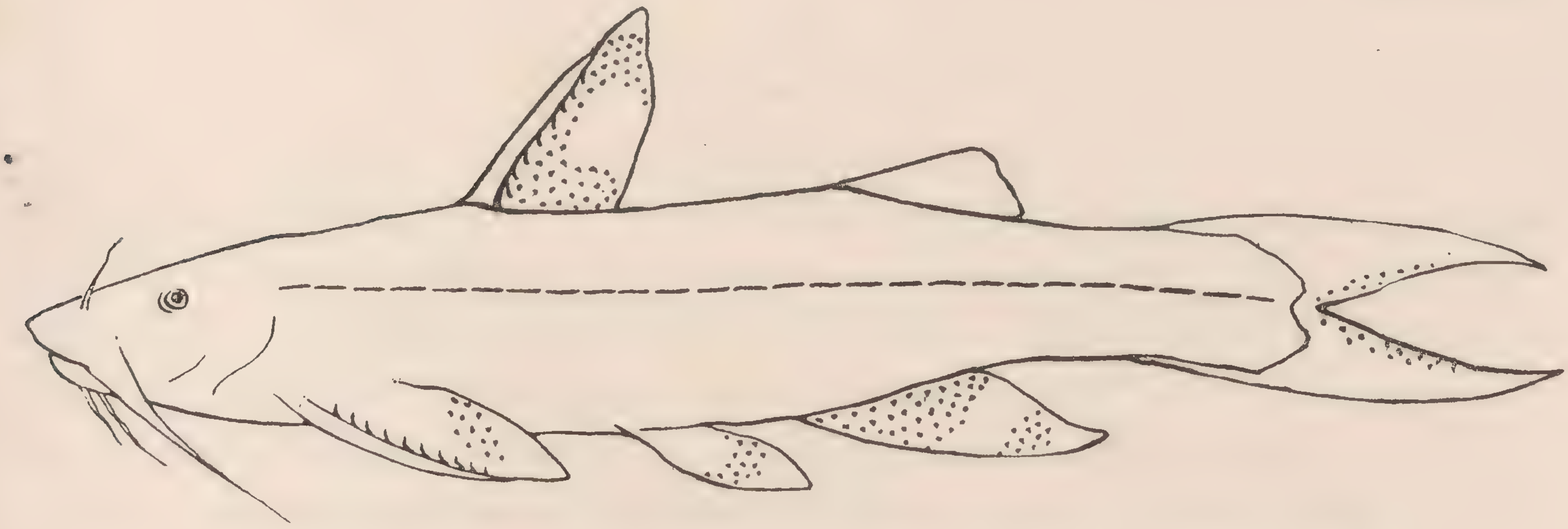

Fig. 7. *Glyptosternon hainanensis*, type. 55 mm. without caudal.

DESCRIPTION OF TYPE.—Number 8362, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 55 mm. Depth in length 4.6; head 3.7. Snout in head 2.2; interorbital 3; width of mouth 2.2; maxillary barbel 1.3; depth of peduncle 2.5; its length (from anal axil) 1.5; pectoral spine 1.2; dorsal spine 1.5; ventral 1.4; longest anal ray 1.4; total length adipose 1.4; dorsal interspace 1.3; caudal lobe 0.8. Eye in snout 4.

Dorsal I, 6; anal 10.

Snout depressed; body at nape triangular; head and breast flat below; body compressed behind the dorsal. Nape rugose striate; with a narrow backward prolongation not quite to the forward point of dorsal shield; eye superolateral; top of head and snout gently and evenly rounding; nasal barbel between the two nostrils which are close together well forward; maxillary barbel adnate at base by a broad membrane; 2 barbels at each side of lower jaw, the outer the larger; mouth inferior, transverse, the lips rather broad; the upper lip and chin slightly papillose; eye without free rim; gill-membranes narrowly joined to isthmus; a narrow pointed exposed spinous scapular process above base of pectoral. Dorsal spine strong, striate, serrate behind; pectoral spine strong, curved, with strong barbs behind; both spines smooth in front. Dorsal origin equidistant from tip of snout and anal origin; pectoral just not reaching to ventral origin, ventral just not to anal origin; caudal strongly forked with narrow pointed lobes, its rudimentary basal rays precurrent keel-like above and below; adipose with conspicuous false rays, narrowly free behind. Texture of skin below dorsal and on sides of head scaly.

Color dark gray, the fins somewhat browner. Dorsal and anal with dark bases, a blackish subterminal mark across the dorsal and anal, and a similar mark nearer the middle of the ventral.

This is apparently well distinguished by the bold, dark markings on the fins from *Glyptosternon majus* (Boulenger) of Borneo, to which it appears to be close. We have compared it with a specimen of *Glyptosternon sinense* from Tungting and with the description and figure of *Pimelodus asperus* McClelland from Chusan, a related fish.

Our only two specimens of *G. hainan* were brought out of the mountains south of Nodoa. It probably does not occur in the vicinity of that town.

COBITIDÆ. Loaches

Loaches are more or less elongate fresh-water fishes related to the carps. Mouth small, inferior, surrounded with barbels in more than two pairs; scales very small or absent; air bladder more or less completely inclosed in a bony capsule; sometimes an erectile spine beneath the eye. They are Eurasian, with center of abundance and variety in the Orient.

The aberrant genus *Gobiobotia* stands somewhat apart from both loaches and carps in an intermediate position between the two. Following the technical characters otherwise convenient to separate the two groups (presence of more than two pair of barbels, air bladder in a bony capsule) it is a loach. In general, however,—short body, comparatively large scales (between 40 and 50), etc.,—it resembles much more closely a gobionin carp, and we are inclined to follow Berg in placing it in the family Cyprinidæ. This decision hinges on our general concept of the history of the loaches, descended from loach-like carps now extinct, somewhat though not very closely related to this relic genus.

Related to the true loaches are several more specialized genera of bottom fishes wherein the front part of the body is depressed, the pectorals and, to a large extent, the ventrals expanded, rounded, placed in a more or less horizontal plane. These are commonly separated in the family Homalopteridæ. But we have seen a fish from Szechwan, China, very close to the genus *Barbatula* of true loaches, which is yet essentially a homalopterid, and we are too impressed with the close relationship of such forms to the other loaches to assign them more than subfamily rank.

Cobitinæ

COBITIS Linnæus

LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., I, p. 300. Type: *Cobitis tænia* Linnæus.

Elongate, compressed, the head strongly compressed. An erectile spine beneath the eye. Four pairs of barbels about the mouth. Body covered with small scales, the lateral line evident. Caudal truncate or rounded. Sharply marked with lengthwise stripes or rows of blotches. A single widely distributed Eurasian fish more or less separable into geographic forms.

Cobitis tænia Linnæus

Cobitis tænia LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., I, p. 300.

Cobitis tænia dolichorhynchus Nichols

Cobitis dolichorhynchus NICHOLS, 1918, Proc. Biol. Soc. Wash., XXXI, p. 16, Fukien.

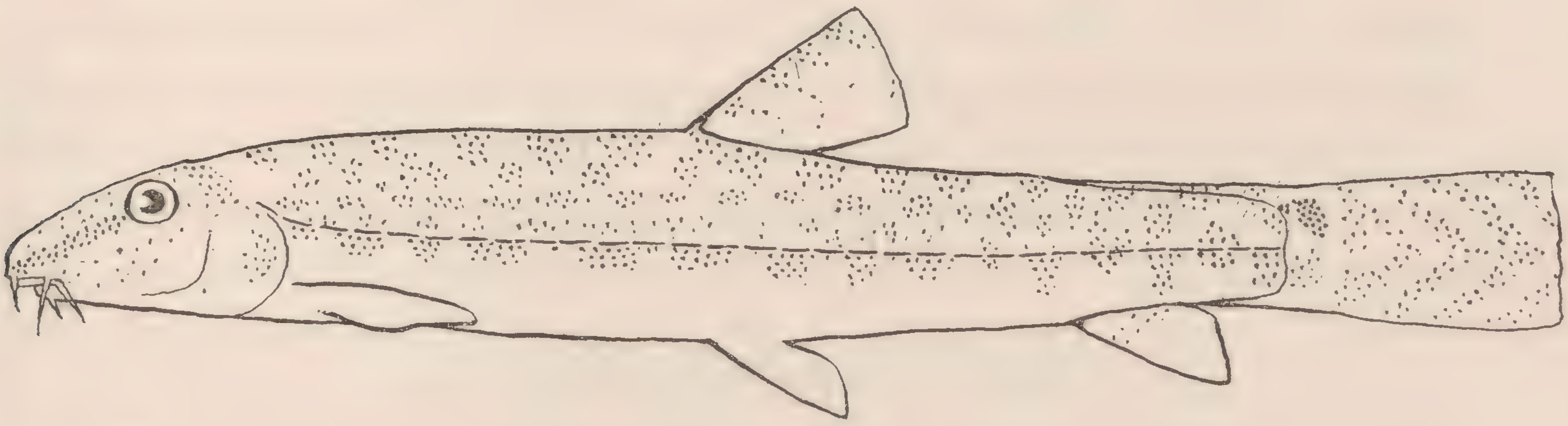

Fig. 8. *Cobitis tænia dolichorhynchus* Nichols. 61 mm. without caudal.

Cobitis tænia from Hainan is so close to material from Fukien with which it has been compared as to be indistinguishable. It appears to differ slightly from *Cobitis biwæ* Jordan and Snyder (1901, Proc. U. S. Nat. Mus., p. 748) of Japan, synonymized with Eurpoean *C. tænia tænia* by Jordan and Fowler and by Berg. It resembles the European fish, but is quite different from Yangtze material (*Cobitis* [*tænia*] *sinensis* Sauvage and De T., 1874–1875, Ann. Sci. Nat., Szechwan) having a shorter body; shorter peduncle not conspicuously bordered with adipose keels; dorsal origin nearer base of caudal than tip of snout; more sharply marked color pattern in specimens of about 80 mm.

Specimens of 78 to 81 mm. length (to base of caudal) measure as follows. Head in length 4.4 to 4.6; depth 5.5 to 6.0. Eye in head 4.5 to 5; snout 1.9 to 2; depth of peduncle 2 to 2.4; its length 1.7 to 1.9.

Description of a specimen from Nodoa, April 3, 1923.—Length to base of caudal 61 mm. Depth in length 5.6; head 4.3. Eye in head 4.5; snout 2.5; depth of peduncle 2.2; pectoral 1.5; ventral 1.6; longest dorsal ray 1.4; longest anal ray 1.6; caudal 1. Interorbital in eye 2; width of mouth 1.5; maxillary barbel 1.

Dorsal 10; anal 7½. Scales before dorsal about 90.

Body compressed; head strongly so. Eye subcutaneous; an erectile spine before its lower anterior corner, with a short secondary basal cusp; mouth inferior, strongly curved; lips thick, the lower occupied by a pair of short thick barbels; longer barbels at the tip and at the side of the maxillary and a pair on the tip of the snout overhanging the mouth in front, the three pairs of about equal length. Gill slit slanting down somewhat backward, terminating below about in front of the first ray of the pectoral. Dorsal origin equidistant from front of eye and base of caudal; pectoral not quite reaching half way to ventral; ventral under middle of dorsal, half-way to anal; caudal truncate, its rudimentary rays precurrent above and below in short, slightly raised fleshy keels.

Some 19 dark spots along the back; about 13 bolder more or less linear blotches along the side; irregular rivulate spotting or streaking between; a dark stripe from eye to snout; cheek speckled; lower parts and lower fins pale. Dorsal spotted; caudal with a short vertical oval ocellate black spot on the upper angle of its base, and about four V-shaped, dark cross-bars.

MISGURNUS Lacépède

LACÉPÈDE, 1803, 'Hist. Nat. Poiss.,' V, p. 16. Type: *Cobitis fossilis* Linnæus.

Elongate, compressed; no spine about the eye; mouth surrounded with five pairs of barbels; scales small, striate, the lateral line slightly evident in front only; caudal truncate or rounded. Widely distributed in Eurasia, separable into few closely related species and races.

Misgurnus mizolepis Günther

Misgurnus mizolepis GÜNTHER, 1888, Ann. Mag. Nat. Hist., p. 433, Yang-tze.
Misgurnus decemcirrosus FOWLER, 1924, Bull. Amer. Mus. Nat. Hist., III, p. 395.

Misgurnus mizolepis hainan, new sub-species

Plate XXVI, Figure 1

?*Misgurnus psammismus* RICHARDSON, 1846, 'Ich. Chin.,' p. 300, Canton.

DESCRIPTION OF TYPE.—Number 8363, American Museum of Natural History. Locality: Nodoa, Hainan, March 16, 1923. Length to base of caudal 83 mm. Depth in length 7.5; head 6. Snout in head 2.6; width of body 1.7; depth of peduncle 1.5; its length 0.8; pectoral 0.9; ventral 1.4; longest dorsal ray 1.3; longest anal ray 1.4; caudal 0.8. Eye in snout 2; interorbtial 2; maxillary 1.7; barbel 1.2.

Elongate, moderately compressed; vent almost immediately before anal origin, not more than one-sixth distance to ventral axil. Snout rather blunt; interorbital convex; eye without trace of free rim; mouth inferior horizontal semicircular; lower lip weakly cleft; 3 subequal barbels above, two small ones below the anterior much the smaller; gill cleft slanting a little backward; the gill membranes adnate before the upper pectoral rays. Dorsal origin equidistant from base of caudal and middle of opercle; ventral origin slightly behind that of dorsal; pectoral pointed, extending three-eighths distance to ventral, ventral one half to anal; caudal narrow, rounded subtruncate behind, with well-developed precurrent keels, not fleshy. Scales with close-set horizontal subparallel little radiating striæ, embedded in thick slimy skin; short trace of a lateral line behind head only.

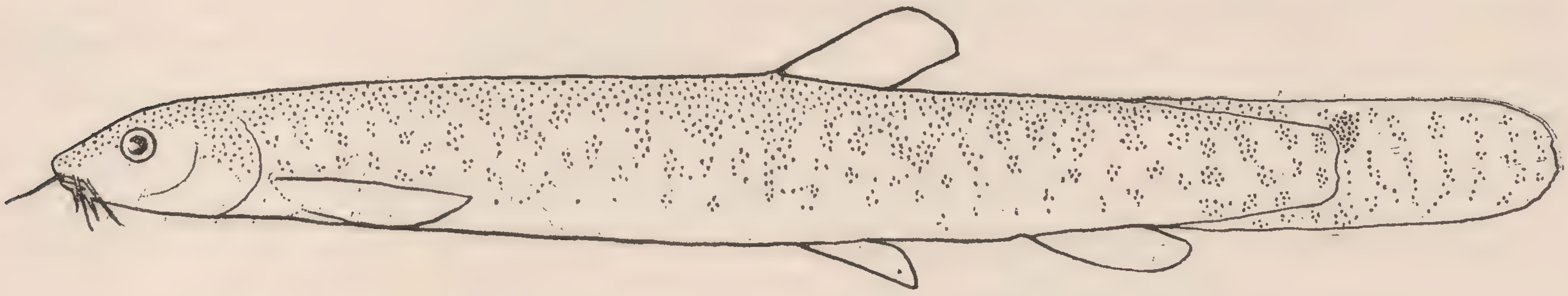

Fig. 9. *Misgurnus mizolepis hainan*, type. 83 mm. without caudal.

Dorsal 9; anal 7. Scales about 150.

Dark along the back, the sides pale with prominent irregular blackish spots, the largest about the size of eye. Black spot at upper caudal base; caudal with narrow irregular blackish barring; dorsal faintly spotted, pectoral and anal slightly marked, ventral pale, unmarked. A color sketch from life is olive on the back, buff beneath; the sides with sharply marked black spots of varying size; the pectoral, dorsal and caudal fins with a few faint specks; the side of the head, a livid bluish with one or two faint lengthwise streaks; the eye red and the barbels banded.

Various authors recognize two distinct loaches of the genus *Misgurnus* from China: the traditional *Misgurnus anguillicaudatus* and *Misgurnus decemcirrosus* (Basil.), which, being unidentifiable, has apparently not always been used for the same form. Fowler (1924, Bull. Amer. Mus. Nat. Hist., III, p. 395) uses *decemcirrosus* for the readily identifiable *Misgurnus mizolepis* Günther. With a rather extensive collection of *Misgurnus* from various parts of China at hand, we find a single distinct form in Hainan. On the basis of the Yang-tze valley material, this is as close to *anguillicaudatus* as to *mizolepis*, but *mizolepis* from Fukien indicates rather clearly that its relationships are with this latter fish.

The diagnostic characters of *Misgurnus mizolepis hainan* are as follows:

Skin more or less thickened and scales more or less embedded; body moderate or elongate, peduncular keels about precurrent caudal rays not fleshy or excessively developed; head small (6 or more in length); dark markings on side contrasted; peduncle long (slightly longer than head); spots on sides irregular, varying in size, some as large as eye; compressed (with of body 2 in head).

Misgurnus mizolepis punctatus Oshima

Misgurnus punctatus Oshima, 1926, Annot. Zool. Japon., XI, p. 5. Kachek River, Hainan.

Depth in length to base of caudal, 6.5; head 6.5. Eye in head 6; snout 2.25; interorbital 4.5; width of head 1.64; pectoral 1.56; ventral 2.40. Dorsal with 8 rays; anal with 7. Scales, about 140. Body elongate, cylindrical, tail compressed. Origin of dorsal much nearer to base of caudal than tip of snout, inserted slightly in advance of the root of the ventrals. Caudal rather short, tip broadly rounded; caudal peduncle deep, its depth 1.28 in head. Sides, cheeks, opercles, and maxillary barbels finely speckled with black; base of the caudal above with no black spot. Length 132 mm.

This loach does not agree with any specimen of *M. m. hainan* we have examined. It may prove to be an intermediate between that and *M. m. fukien* Nichols (1925, Amer. Mus. Novit., No. 169, p. 4).

NEMACHEILUS Van Hasselt

Van Hasselt, 1823, 'Poissons de Java,' Allgemeine Konst en Letterbok, II, p. 133. Type: *Cobitis fasciatus* Valenciennes.

Small, rather short-bodied loaches with three pairs of long barbels about the mouth; no spine about eye; dorsal of moderate length (about 14); caudal truncate or lunate; nostril in a well-developed tube; scales very small or absent, lateral line complete. Numerous species in southern Asia, etc.

Nemacheilus pulcher, new species

Plate XXVI, Figure 2

A small brightly marked squarish tailed loach.

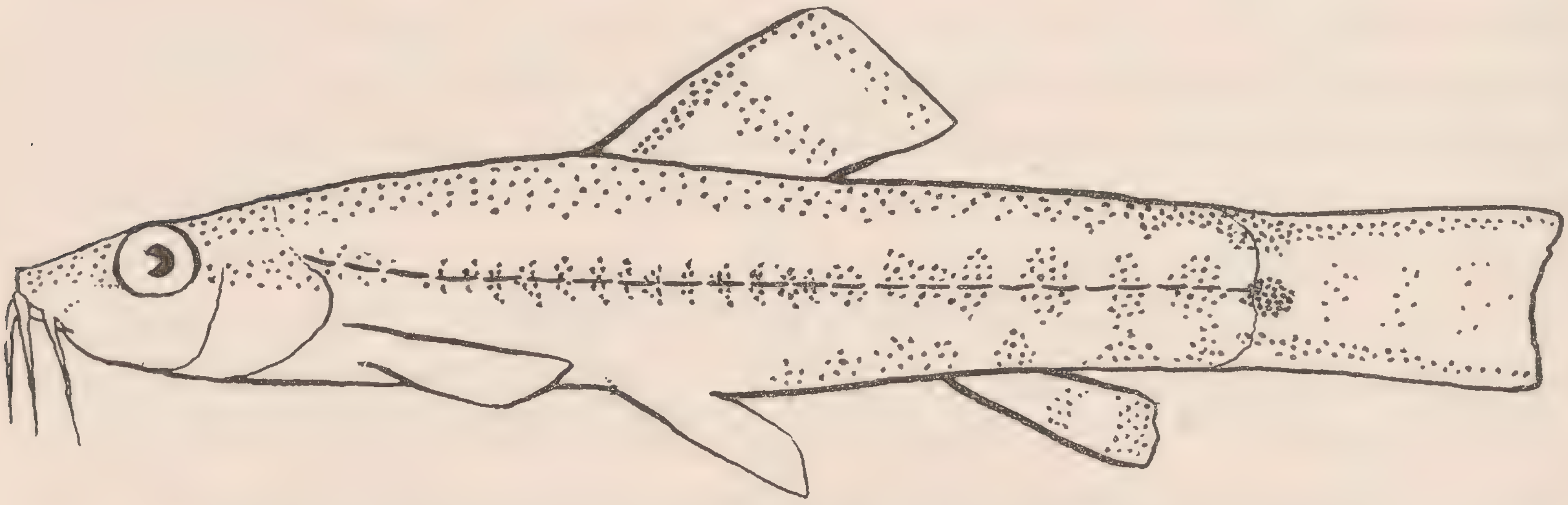

Fig. 10. *Nemacheilus pulcher*, type. 42 mm. without caudal.

Description of Type.—Number 8364, American Museum of Natural History. Locality: Nodoa, Hainan, July 12, 1923. Length to base of caudal 42 mm. Depth in length 4.5; head 3.8. Eye in head 3.5; snout 2.4; interorbital 3; width of mouth 3.5; depth of peduncle, 1.8; pectoral 1.1; ventral 1.4; longest anal ray 1.5; longest dorsal ray 1.4; caudal lobe 0.9.

Dorsal 14; anal 8. Scales about 100.

Moderately compressed, more so posteriorly. Mouth small, inferior, curved, with papillose lips, two central papillæ of upper lip enlarged to small barbels; mouth overhung in front by two pairs of long barbels on the snout, a long maxillary barbel also present; eye with free rim; gill-membranes joining isthmus below base of pectoral; nostril in a rather long tube; conspicuous line of pores from snout below and behind eye, no evident spines on head. Ventral origin a little behind that of dorsal; pectoral not reaching ventral; ventral not reaching anal; caudal subtruncate, its margin slightly concave; its upper precurrent rays arched in a low keel. Body with small scales; lateral line complete.

Top of head and back dark; a dark lateral shade comprising small black cross-marks in center of side, larger oval blotches on the peduncle; a black spot on center of caudal base; a few dark blotches along the lower edges of the body from the ventrals to the caudal. Front of dorsal with a black submarginal streak, behind which are broad dark central and submarginal bands; anal with faint marginal and broken central bands; caudal with submarginal streak above and below, and a few spots on its middle rays.

A color sketch from life may be described as follows: ground color pale yellowish; back dusky crossed by five pale bars before the dorsal, and a similar curved pale bar downward from dorsal origin; a dusky shade backward in the middle of the side from the upper angle of the gill-cleft; changing to short blue bars, which extend back to about opposite anal origin, thence about four wider diamond-shaped bars to the middle of the peduncle, and a blue spot in the centre of the caudal base; fins pinkish; the front of the dorsal narrowly blackish and that fin crossed by a central and submarginal dusky band, a central and submarginal dusky band crossing the anal; caudal with submarginal blackish streaks above and below and a narrow dusky submarginal band across the end, dusky marks in the center.

Homalopterinæ

HOMALOPTERA Van Hasselt

Van Hasselt, 1823, 'Poissons de Java,' Allgemeine Konst. en Letterbok, II, p. 130. Type: *Homaloptera fasciata* Van Hasselt.

Ventrals separate, with 8 to 11 rays; three pairs of barbels, two of which are at front of snout. Numerous species in southern Asia and the Indies.

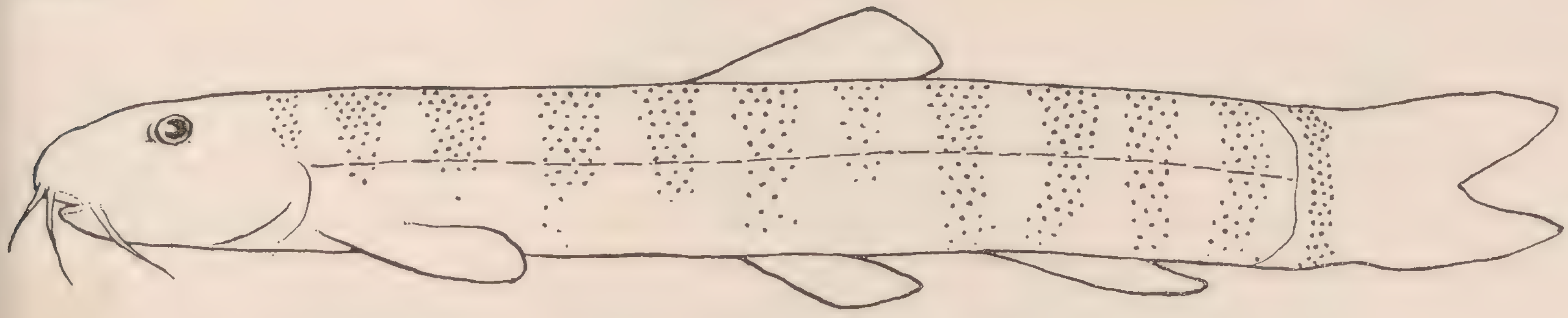

Fig. 11. *Homaloptera fasciolata* Nichols and Pope. 60 mm. without caudal.

Homaloptera fasciolata, new species

Description of Type.—Number 8365, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 60 mm. Depth in length 7; head 4.4. Eye in head 6; snout 2.6; interorbital 3.4; maxillary 2.9; width of mouth

2.5; posterior snout barbel 2.7; greatest width (at back of head) 1.4; depth of peduncle 2; its length 1.6; pectoral 1.3; ventral 1.4; longest dorsal ray, 1.5; longest anal ray 1.6; caudal lobe 1.

Dorsal 10; anal 7. Scales very fine, scarcely evident except on sides posteriorly.

Elongate; head depressed; body squarish before dorsal, compressed behind it; peduncle with a low keel above and below confluent with the rudimentary caudal rays; vent slightly nearer anal origin than ventral axil. Lower surface of head, breast and belly flattish; front and sides of head above gently rounded, sloping; outline of snout from above a blunt rounded point; top of head flat, the orbital rim slightly raised; orbit with a free rim; two barbels at each side of the tip of the snout, the posterior slightly longer than a barbel near the tip of the maxillary, and decidedly longer than the anterior. Mouth inferior, transverse, slightly curved; the lips rather full and flaring, free from the jaws; the lower jaw and lower lip cleft; lower end of gill cleft curving downward and backward to terminate below the base of the pectoral. Dorsal origin equidistant from base of caudal and front part of snout; very slightly behind ventral origin; pectoral and ventral reaching a little more than one-half distance to ventral and anal respectively; caudal notched the lower lobe slightly the longer and less pointed.

About eleven more or less obscure broad dark bands across the back and sides; and a narrow blackish bar across caudal base. Dorsal more or less dusky at base and in center; lower fins plain. Of several individuals, the smaller are more sharply marked.

Gastromyzon Günther

Günther, 1874, Ann. Mag. Nat. Hist., XIV, p. 454. Type: *Gastromyzon borneensis* Günther.

Body short, flattened below; ventrals with 18 to 21 rays, united to form a suctorial disk. Few species, East Indian.

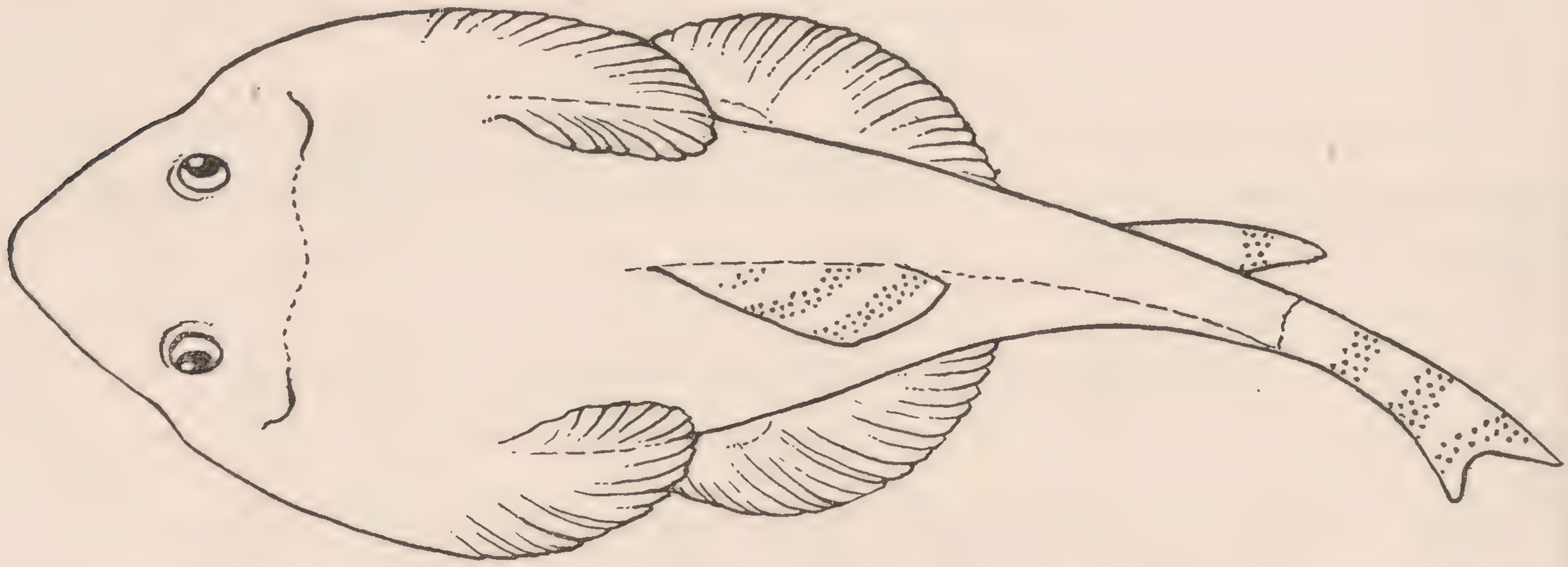

Fig. 12. *Gastromyzon leveretti*, type. 50 mm. without caudal.

Gastromyzon leveretti, new species

A small *Gastromyzon* with barred fins and excerted snout.

Description of Type.—Number 8366, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 50 mm. Depth in length

5.6. head 4; pectoral 2.2; ventral 2.8; width between pectoral axils 4; width of ventral disk 2.5. Eye in head 5; snout 2; interorbital 2.2; depth of peduncle 2; its length 2.8; longest dorsal ray 1.4; height of anal 1.5; caudal 1. Width of mouth in snout 2.5; width of gill-cleft 2.6; snout to mouth 3.4.

Dorsal 10; anal 9; pectoral about 30; ventral about 23; scales about 75.

Ventral surface of head and body flat; the bases of the pectorals united with the lower surface of the body to form an oval disk; the ventrals so united to form a circular disk, overlapped by the free ends of the pectorals behind their axils; free end of pectoral 1.4 in its adnate base; tips of ventrals separated behind for about the distal one-third of the last ray; vent equidistant from axil of ventral and origin of anal. Head and body before dorsal depressed, evenly convex; the profile slanting down at an angle of about 45°; peduncle compressed. Mouth entirely inferior; small, semicircular, transverse; upper jaw protractile; a small barbel at the end of the maxillary; several barbels on lower surface of snout overhanging front of mouth; orbital rim free; head with small warty points; largest on edge of snout, small on top of head and on sides back of head. Dosral origin equidistant from tip of snout and base of caudal; caudal obliquely emarginate, the lower lobe the longer. Lateral line complete, straight, in the center of side; an elongate fleshy flap in the upper axil of the ventral.

Dark olivaceous above; yellowish brown below. Dorsal and caudal barred with black, and anal with one black cross-mark.

Named for Rev. William J. Leverett, of the American Presbyterian Mission of Hainan, who contributed in no small degree to the success of our ichthyological work in Hainan.

Though not found about Nodoa, this fish is probably abundant in the mountain streams to the south.

CYPRINIDÆ. The Carps

Carps are the dominant fresh-water fishes of the present day. They reach their greatest development in Asia, particularly southeastern Asia. They are abundant in individuals and species in North America, though less divided into major forms, and are also well represented in Africa; but are absent in South America, which continent it would seem they have not yet invaded. Carps have no teeth in the mouth, but one or more rows of strong well-spaced teeth on the pharyngeal bones. The typical carp is a fish of normal shape; well scaled; a shortish dorsal fin in the center of the back with or without an initial spine; the caudal more or less lunate or forked. Barbels about the mouth may be present or absent, when present definite in position at the sides and end of the maxillary, not more than two pairs.

Aside from a few aberrant forms, inter-relation of the Cyprinidæ is close, but for convenience they may be divided into several series or subfamilies.

The dorsal and anal fins of cyprinid fishes regularly begin with two simple rays, the second, or last simple ray, long, the first short. These two rays figure in our fin-counts, whether (as in some cases) or not they are sufficiently spinous to be designated as spines (in roman). Occasionally a third simple ray or spine may be made out before these two, but this does not figure in the fin counts, even when sufficiently well developed so that it quite naturally would be counted.

Cyprininæ

This subfamily is frequently restricted to the aberrant carp (*Cyprinus*) and goldfish (*Carassius*) with long dorsal fin and serrate anal spine, but these have an obvious affinity to *Barbus* and related forms included in the Cyprininæ by Weber and de Beaufort (1916, 'Indo-Australian Fishes,' III) and by the present writers also. Whereas the series from *Barbus* through primitive *Labeo* to *Garra* (better known as *Discognathus*) is likely an evolutionary one; supposing *Varicorhinus* and *Xenocypris* in turn to be derivatives of *Garra*, we would accord this phylum or trend with *Garra* as a primitive member subfamily rank, and also separate the gudgeons from the carps proper in like manner.

BARBUS Cuvier

CUVIER, 1817, 'Regne Animal,' 1st Ed., II (Reptiles, Fishes, etc.), p. 192. Type: *Cyprinus barbus L.*

This large genus is most deversified in the warmer parts of Asia, in Africa, and the Indies. Its type species, however, is a comparatively fine-scaled fish from Northern Europe. *Barbus* has been split into many genera differing but slightly. The aims of nomenclature would seem to be best served for the present by leaving its multitude of closely related species in the genus *Barbus* and recognizing a comparatively few main divisions as subgenera.

Symmetrical free-swimming forms for the most part of small or moderate size; mouth normal or slightly specialized, terminal or somewhat inferior, with two pairs of barbels, occasionally reduced to one pair or absent; scales moderate or large; dorsal short with or without an initial spine (present or absent in otherwise closely related forms) which is frequently serrate when present, caudal forked; no anal spine. Vent situated immediately before anal origin.

Subgenus **Spinibarbus** Oshima

Barbus denticulatus, (Oshima)

Barbus putitora McClelland, 1844, Calcutta Journ. Nat. Hist., IV, p. 399, fig.; not *B. putitora* Hamilton-Buchanan. *Spinibarbichthys denticulatus* Oshima, 1926, Annot. Zool. Japon., XI, p. 11. Kachek River, Hainan.

Description of a specimen (Number 8388, American Museum of Natural History). Locality: Nodoa, Hainan.

Length to base of caudal 85 mm. Depth in length 3; head 3.7. Eye in head 3.3; snout 3.5; interorbital 2.5; maxillary 2.9; posterior barbel 3; depth of peduncle 2; its length 1.9; pectoral 1.1.; ventral 1.4; longest dorsal ray 1.1; longest anal ray 1.4; caudal lobe 0.8.

Dorsal II, 9; anal 8. Scales 29. Teeth 3-rowed, 5, 3 or 4, 2; stout, slightly hooked.

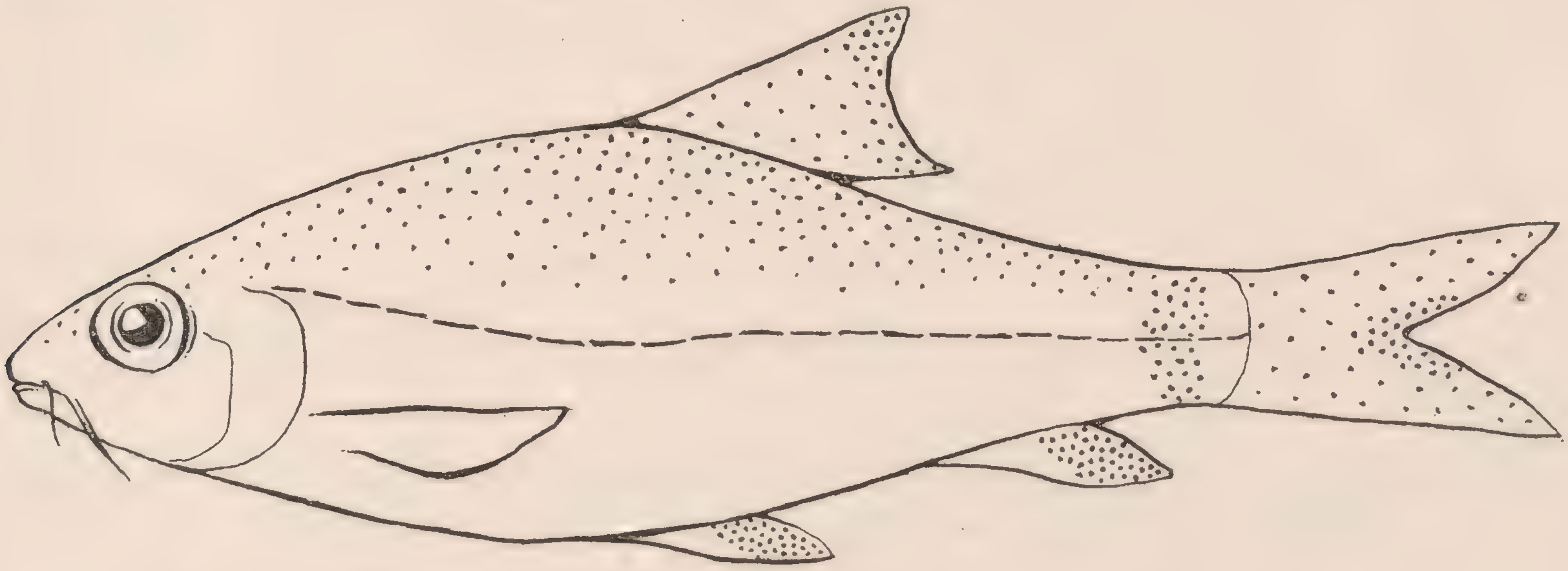

Fig. 13. *Barbus denticulatus* (Oshima). 85 mm. without caudal.

Compressed. Interorbital flat; snout rather pointed; extending slightly beyond the inferior horseshoe-shaped mouth; maxillary protractile; upper lip with cross striæ; the lower free in front; 2 barbels, the posterior decidedly the longer; gill-membranes narrowly joined to isthmus under edge of preopercle. Last simple dorsal ray a slender spine in its basal part, with a soft tip (heavier and finely serrate behind in larger specimens); dorsal origin equidistant from base of caudal and front of eye; over ventral base; pectoral extending three-quarters the distance to ventral; ventral two-thirds the distance to anal; caudal forked with narrow pointed lobes. Scales rough, with radiating striæ; lateral line complete, dropping a little over pectoral, thence running straight, below the center but rising on peduncle and terminating in center.

Dark gray above, the scales narrowly dark-edged, and ill-defined streaks following their centers lengthwise the fish; lower surfaces pale; a vague dark blotch on peduncle at base of caudal; dorsal more or less dusky, its last rays tipped with whitish; pectoral pale; ventral and anal black distally, margined with whitish at the inner corner; caudal grayish, dusky on tips and in notch.

Barbus nigrodorsalis (Oshima)

Spinibarbus nigrodorsalis Oshima, 2926, Annot. Zool. Japon., XI, p. 10. Kachek River, Hainan.

A large-scaled *Barbus*, two pairs of barbels, dorsal black-bordered.

Description of a specimen (Number 8367, American Museum of Natural History). Locality: Nodoa, Hainan, April 23, 1923.

Length to base of caudal 115 mm. Depth in length 4.1; head 3.6. Eye in head 4; snout 3; interorbital 2.7; maxillary 3.5; posterior barbel 3.5; anterior barbel 5; depth of peduncle 2.5; length of peduncle 2.5; pectoral 1.5; ventral 1.6; longest dorsal ray, 1.8; height of anal 1.9; caudal lobe 1.1.

Dorsal 11; anal 7. Scales 20 (last on base of caudal). Teeth 3-rowed, 5, 3, 2; with narrow pointed tips; slightly bent, the main teeth stout.

Head broad, flat-topped, blunt; mouth horizontal, lower jaw slightly the shorter; two slender maxillary barbels; gill-membranes joined to the isthmus; patch of small horny warts on right preorbital; maxillary to under front margin of eye. Last simple ray of dorsal not enlarged or spiny; ventral under center of dorsal; pectoral not reaching ventral; ventral not reaching anal. Lateral line complete; scales roughened with close-set subparallel horizontal striæ.

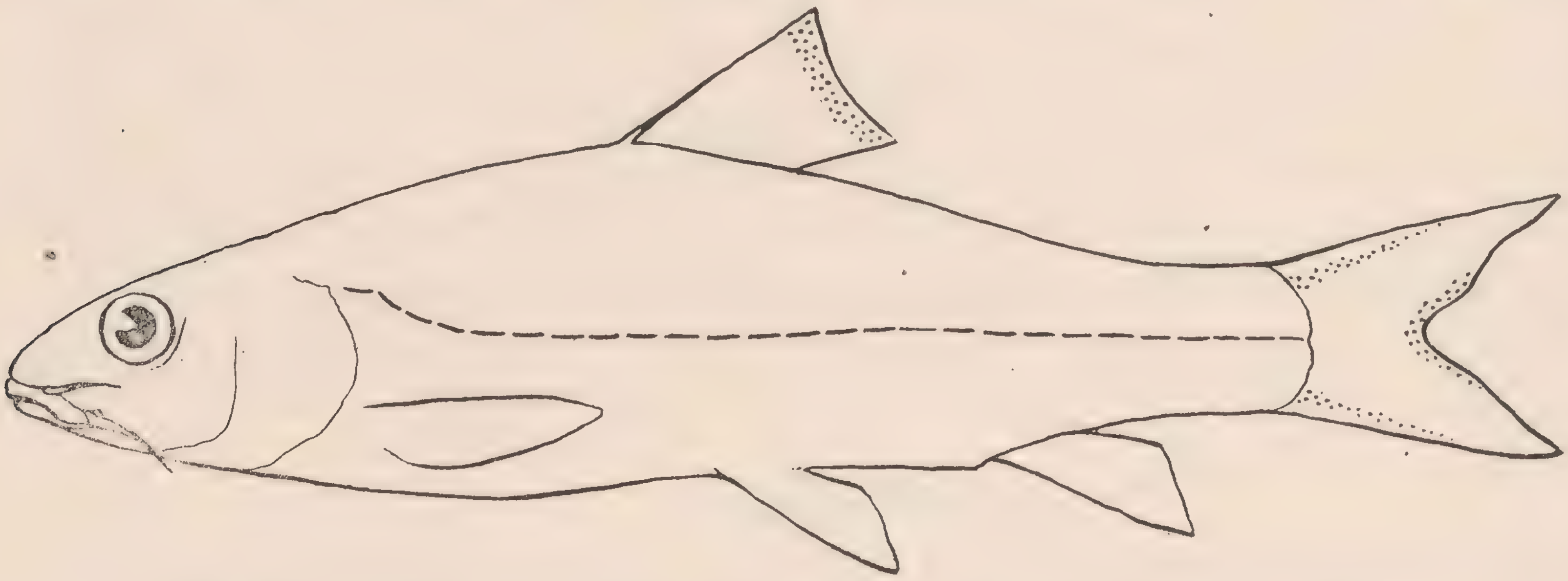

Fig. 14. *Barbus nigrodorsalis* (Oshima). 115 mm. without caudal.

Dark along the back; scales of sides with dark outlines; belly and lower fins pale; dorsal with conspicuous black upper posterior border; caudal with submarginal dusky streak on the lobes basally, and faint dusky edge in the notch. A color sketch from life is silvery; greenish on the top of head and on the back; scales of back and sides narrowly margined with dark; pectoral, dorsal and caudal fins greenish, the dorsal with a black margin; the caudal with sub-marginal dusky streak above and below; its tips tinged with orange as also the distal portion of the dorsal next to the black margin; ventral and anal fins orange.

Subgenus **Puntius** Hamilton-Buchanan

Barbus semifasciolatus Günther

Barbus semifasciolatus Günther, 1868, 'Cat.,' VII, p. 484.

Description of a specimen from Nodoa, Hainan, March 6, 1923:

Length to base of caudal 34 mm. Depth in length 2.6; head 3.2. Eye in head 2.8; snout 3.8; interorbital 2.5; maxillary 4; depth of peduncle 1.7; its length 1.7; pectoral 1.6; ventral 1.6; longest dorsal ray 1.6; longest anal ray 2; caudal lobe 1.2; barbel in eye 1.7.

Dorsal II, 8; anal 8. Scales 24.

Body deep and compressed. Lower jaw slightly included; mouth small oblique; maxillary not reaching front of orbit, with a single short subterminal barbel; gill-membranes narrowly joined to isthmus. Ventral origin under that of dorsal; pectoral just reaching ventral; ventral not reaching anal; last simple ray of dorsal a slender spine with barbs behind terminally. Body covered with thin cycloid scales with radiating striæ; lateral line complete, little depressed, running in the center of the peduncle.

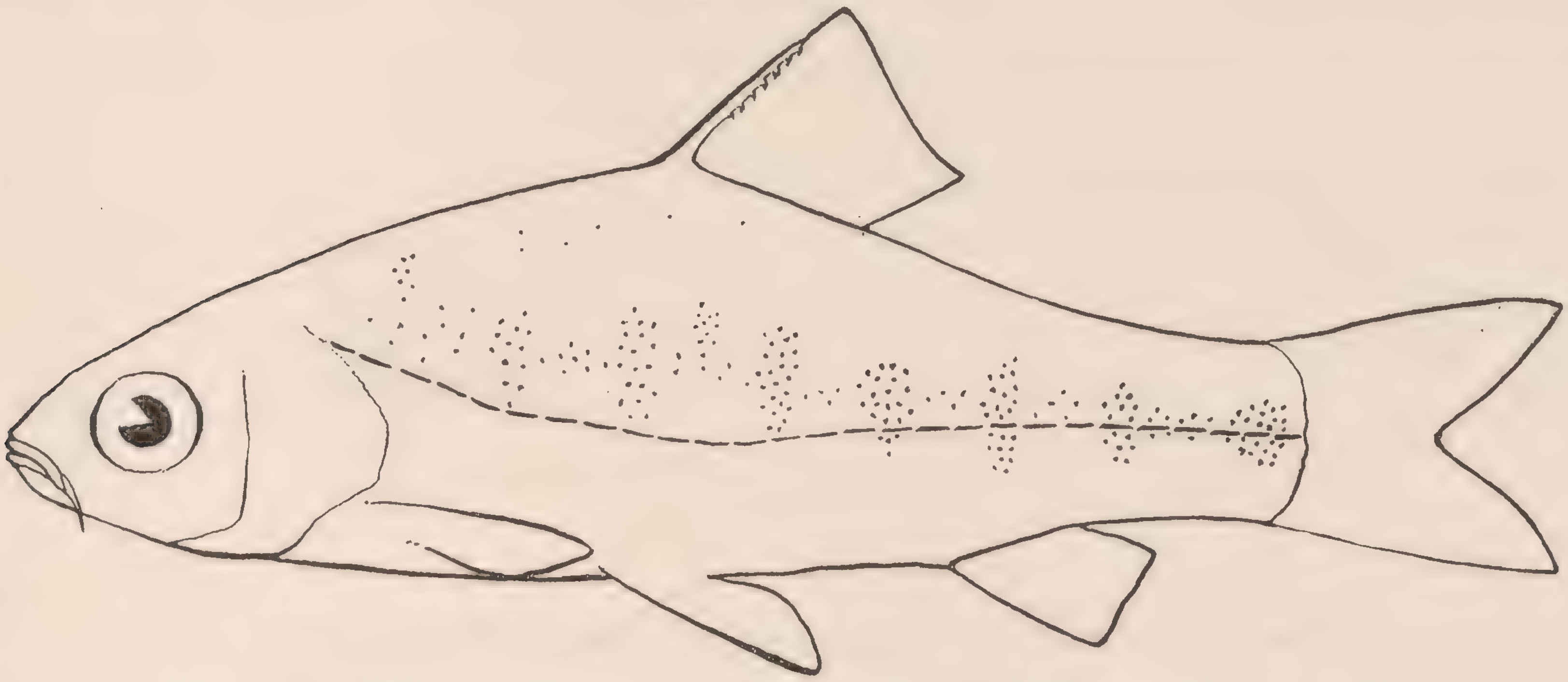

Fig. 15. *Barbus semifasciolatus* Günther. 34 mm. without caudal.

A series of short black bars along middle of side; scales of back and sides edged with dusky. A color sketch from life is olive silvery on the sides, lower parts red; several narrow black bars in the middle of the sides and a black spot at the base of the caudal; fins tinged with red.

This brilliantly colored little fish was common in the many small, grass-grown irrigation reservoirs and ditches of the rice fields about Nodoa. It is hardy, and very variable in color.

Subgenus Lissochilichthys Oshima

Barbus barbodon, new species

Description of Type.—Number 8368, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 193 mm. Depth in length 3.5; head 4.3. Eye in head 5.2; snout 2.5; interorbital 3; maxillary 3.1; greatest width of body 1.9; depth of peduncle 2.2; its length 1.6; pectoral 1.2; ventral 1.3; longest dorsal ray 1.1; longest anal ray 1.2; caudal lobe 0.8. Posterior barbel 1.3 in eye.

Dorsal II, 8½; anal 7½. Scales 41. Teeth 3-rowed, 5, 3, 2, pointed, the tips little bent.

Compressed. Interorbital gently convex; snout pointed, extending a little beyond the inferior slightly oblique mouth; lower jaw with a free tip with horny sheath, projecting beyond the lip the front margin of which is notched in the center; maxillary not nearly to under front of eye; with 2 small barbels, the posterior decidedly the larger; gill-membranes broadly joined to side of breast behind the edge of the preopercle. Last simple ray of dorsal a broad spine with row of sheathed barbs on each side behind, but with a soft tip. Dorsal origin equidistant from tip of snout and posterior part of peduncle; ventral origin slightly behind that of dorsal; pectoral reaching two-thirds the distance to ventral; ventral four-sevenths to anal; anal to caudal base; caudal well forked with pointed equal lobes, the lower the broader. Scales rough with close spaced slightly radiating striæ, subparallel in the center of the scale; lateral line complete, very slightly bent down, in the center of peduncle.

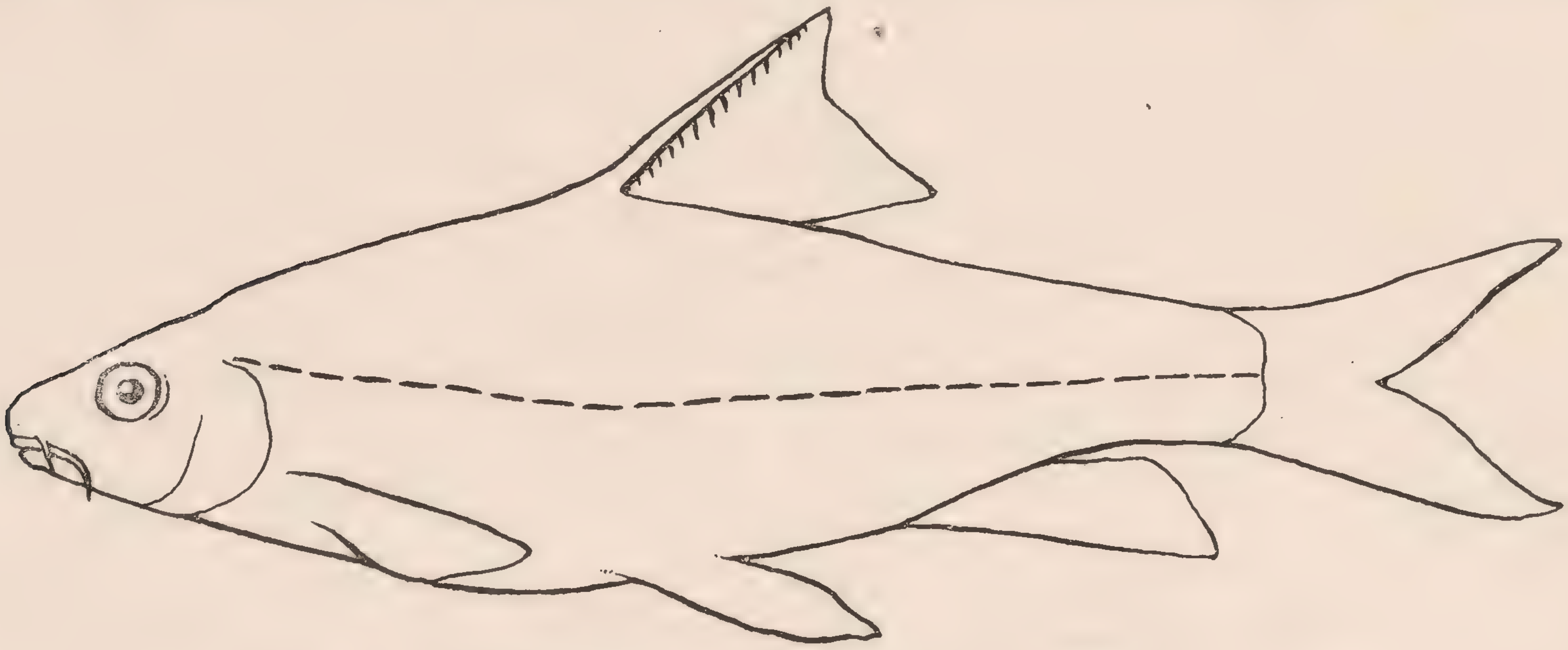

Fig. 16. *Barbus barbodon,* type. 193 mm. without caudal.

Color darkish, uniform; caudal narrowly margined with blackish behind, especially the lower lobe; and blackish on the membranes of the dorsal.

Two other specimens were obtained.

Barbus matsudai (Oshima)

Lissochilichthys matsudai Oshima, 1920, Proc. Acad. Phila., LXXII, p. 121, Pl. III, fig. 2. Formosa.

Oshima (1926) refers to *Barbodes paradoxus* (Günther) a fish from the Kachek River, which seems to us rather to belong with this species which we have in abundance from Fukien province.

Length 55 mm. Sides with vertical black bands. Depth, 3.75; head 4.10. Eye in head 2.75. Dorsal with 10 rays; anal with 7. Scales 40.

CYCLOCHEILICHTHYS Bleeker

Bleeker, 1859, Nat. Tijdschr. Ned.-Ind., XX, p. 431. Type: *C. armatus* Bleeker.

This genus resembles four-barbelled barbs of the subgenus *Lissochilichthys,* and perhaps represents a further development of the same trend or phylum. The mouth is conspicuously inferior and somewhat peculiar, lips are connected around the corner of the mouth. An initial serrate dorsal spine. Species of the East Indies and southern China.

Cyclocheilichthys iridescens, new species

Barbels not fringed; end of tubes of scales of lateral line simple, not bifid; eye 1.5 in postorbital part of head; 16 scales around caudal peduncle; 4 scales between ventrals and lateral line. With finer scales than any East Indian species.

Description of Type.—Number 8369, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 102 mm. Depth in length 3.3; head 4.1. Eye in head 3.8; snout 2.8; interorbital 2.8; maxillary 5; posterior barbel 4.2; depth of peduncle 2.5; its length 1.6; dorsal spine (with filamentous tip) 1; pectoral 1.1; ventral 1.2½; longest anal ray 1.2½; caudal lobe 0.9.

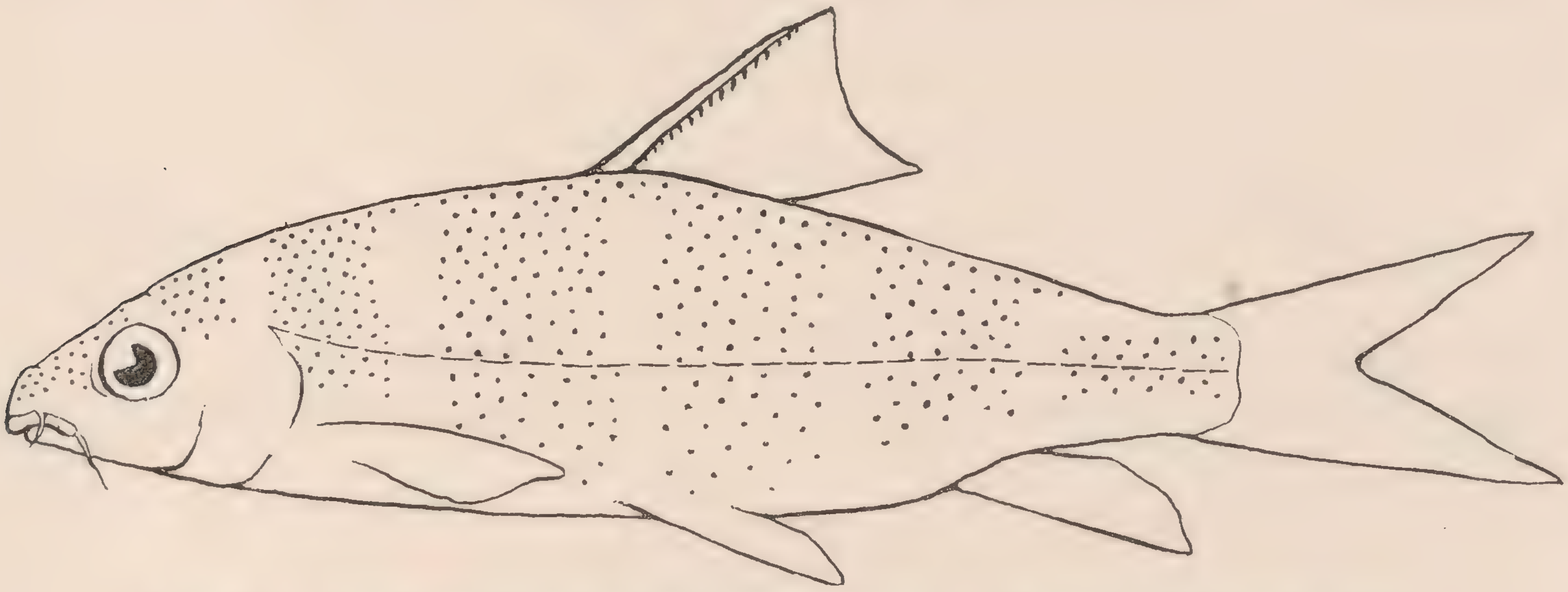

Fig. 17. *Cyclocheilichthys iridescens*, type. 102 mm. without caudal.

Dorsal II, 8; anal 7. Scales 42. Teeth 3-rowed, 4, 3, 2; more or less blunt or imperfectly truncate.

Elongate, moderately compressed, back slightly elevated, breast narrowly rather flat. Snout rather pointed. Mouth small, inferior, horseshoe-shaped, horizontal; maxillary protractile, not reaching eye; with 2 slender barbels, the posterior subterminal, decidedly the longer; lips thick, slightly grooved, crossing the base of the mandible, the narrow fused shank of which extends beyond the lip to a somewhat spatulate end which is striate above (inside), the end of the lower jaw thus resembling condition in *Chilogobio;* gill-membranes joined to breast behind the margin of the preopercle. Dorsal origin equidistant from tip of snout and base of caudal; slightly in advance of that of ventral; front of dorsal with a strong spine, serrate behind, which has a soft filamentous tip forming the apex of the fin; pectoral not reaching ventral, ventral not reaching anal, anal almost to caudal base; caudal strongly forked with pointed equal lobes. Scales rough, with subparallel or slightly radiating striæ; lateral line complete, straight, in center of peduncle.

Above dark, belly pale; scales of sides more or less margined with (or with marginal bars of) dark; 4 or 5 broad dark shades across sides with narrow paler interspaces; fins plain.

Osteochilus Günther

Günther, 1868, 'Cat.,' VII, p. 40. Type: *Rohita melanopleura* Bleeker.

Two pairs of barbels; mouth inferior with expanded conspicuously striate lips, the upper confluent with the lower; dorsal rather long, without a spine; scales of moderate size.

Osteochilus salsburyi, new species

Peduncle surrounded by 16 scales; eye above the level of the upper lip; several (varying in number and distinctness) very small indentations on snout, each at times provided with a minute tubercle, no conspicuous pores. Between ventral and lateral line 4½ series of scales; 6½ series below lateral line before ventral; 6 series between lateral line and dorsal. Depth of peduncle 1.3 in its length.

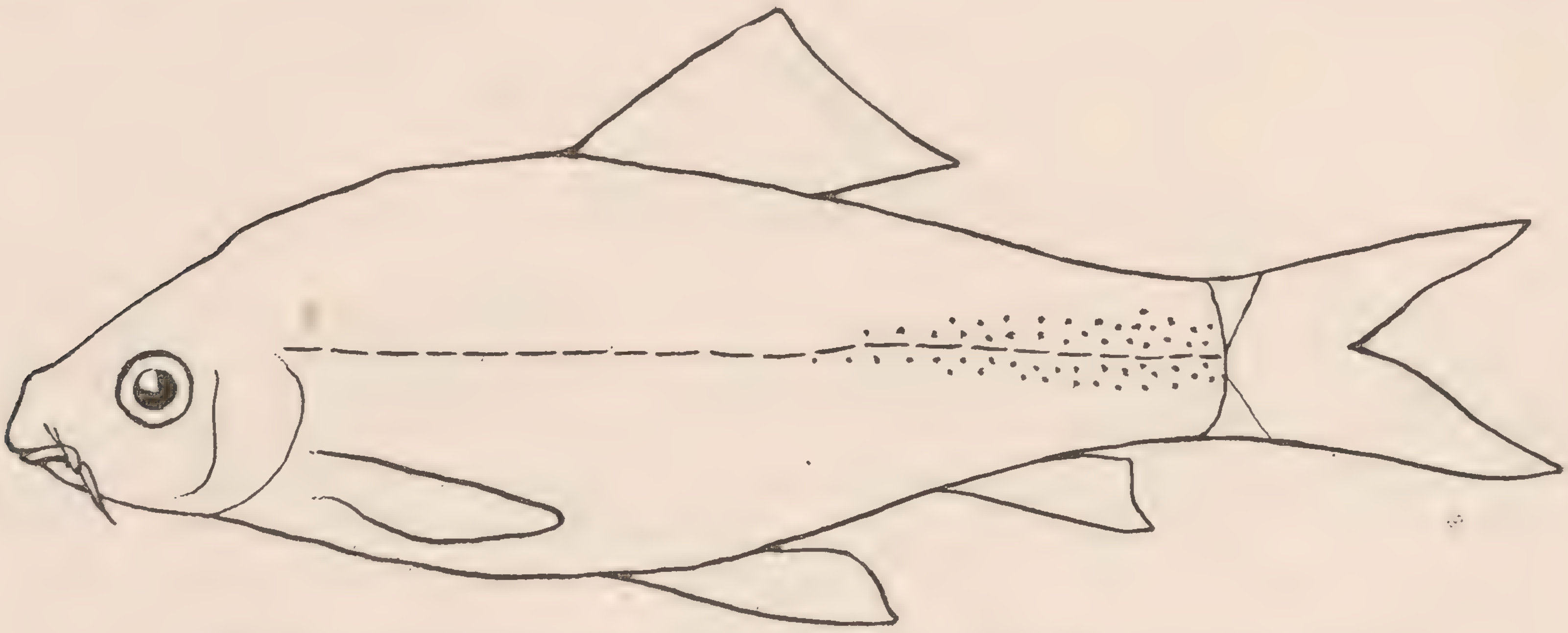

Fig. 18. *Osteochilus salsburyi*, type. 85 mm. without caudal.

Description of Type.—Number 8371, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 85 mm. Depth in length 3.1; head 4. Eye in head 3.9; snout 2.5; interorbital 2; maxillary 3; width of mouth 3.5; maxillary barbel 4.5; depth of peduncle 1.9; its length 1.5; pectoral 1.1; ventral 1.3; longest dorsal ray 1.3; longest anal ray 1.5; caudal lobe 0.8.

Dorsal 13; anal 7½. Scales 34.

Compressed; head broad and blunt. Mouth inferior transverse horizontal horsehoe-shaped, very slightly behind tip of snout; overhung squarely in front by the thick free vertical snout membrane; lower jaw broad and squarish at the end; lips thick fringed striate-papillose, the lower broadly free in front, confluent with chin behind; a barbel at the corner of the snout membranes and subterminally on the maxillary, the latter decidedly the longer; interorbital convex; gill-membranes broadly joined to side of breast behind edge of preopercle. Dorsal and anal without spinous rays; dorsal origin equidistant from tip of snout and anal axil; ventrals situated before the center of dorsal base; pectoral reaching ⅔ the distance to ventral; ventral ¾ to anal; caudal well forked with bluntly pointed equal lobes. Scales rough, with conspicuous close-spaced subparallel horizontal striæ; lateral line complete, straight, in the center.

Color dark, paler on opercle and lower surfaces; a dark central longitudinal band on peduncle faintly indicated; sides with obscure blackish bars on the scale tips.

Apparently slightly different from *Osteochilus vittatus* (Cuvier and Valenciennes, 1842) from Borneo, Java, Sumatra, Tonkin, which is described as having 3 conspicuous pores on snout; and also close to *Osteochilus brachynotopterus* (Bleeker, 1855) from Sumatra. See Weber and de Beaufort, 1916, III, pp. 124–141, for an analysis of this finely divided genus.

Named for Dr. Clarence G. Salsbury, of the American Presbyterian Mission of Hainan, in appreciation of his interest and aid in the work.

A number of specimens. An unusually large one (155 mm. to base of caudal) has 3 small warts in a triangle in center of snout somewhat larger than the others of 20 or so scattered ones.

This is probably what Oshima (1926) has identified with *Osteochilus brachynopterus* (Bleeker) of Sumatra.

CYPRINUS Linnæus

LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., I, p. 320, after Artedi. Type: *Cyprinus carpio* Linnæus.

Anal as well as dorsal with a serrate spine; dorsal long (rarely shorter); two pairs of barbels (rarely one pair); teeth in 3 rows, molar-like.

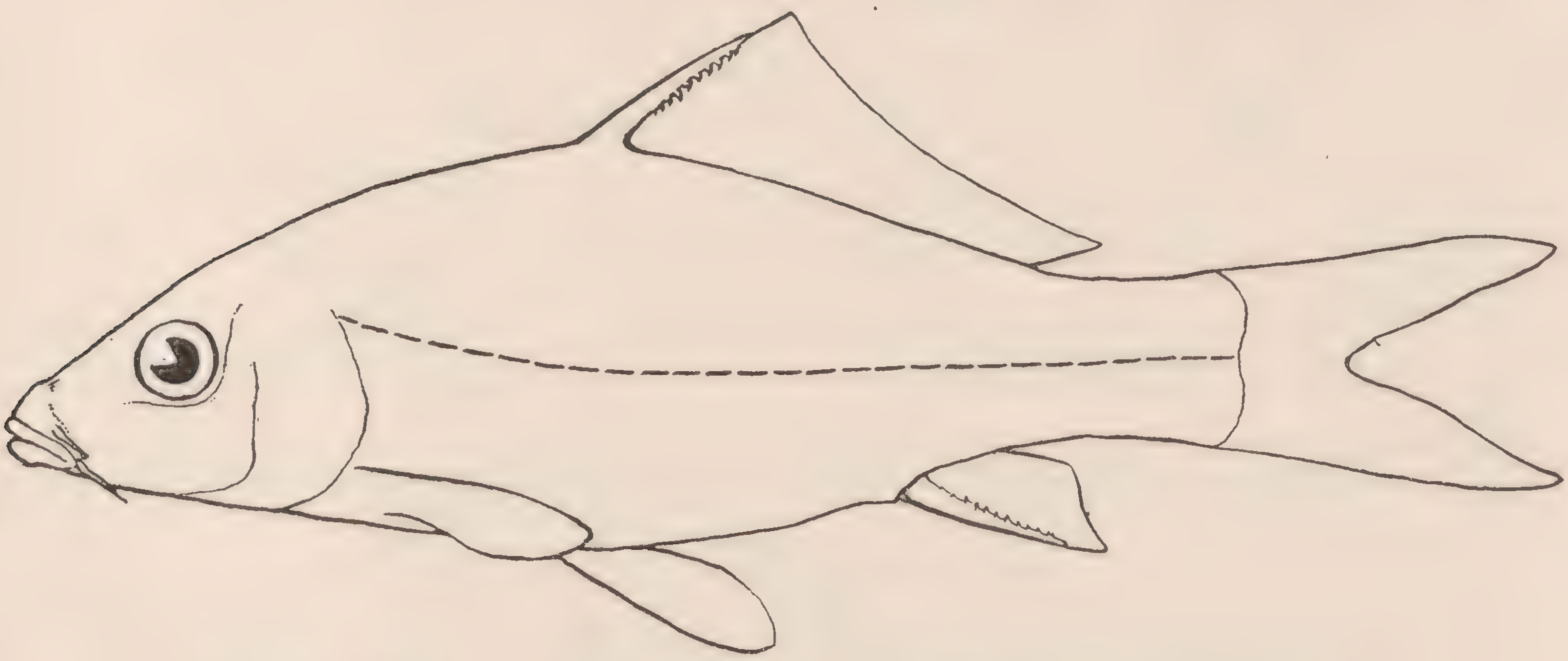

Fig. 19. *Cyprinus carpio* Linnæus. 122 mm. without caudal.

Cyprinus carpio Linnæus

Cyprinus carpio LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., I, p. 320.

Description of a specimen from Nodoa, Hainan:

Length to base of caudal 120 mm. Depth in length 3; head 3.2. Eye in head 4.3; snout 2.6; interorbital 3; maxillary 3.4; maxillary barbel 5.5; depth of peduncle 2.4; its length 2; pectoral 1.5; ventral 1.6; longest dorsal ray 1.7; longest anal ray 1.7; caudal lobe 1.

Dorsal II, 20½; anal II, 5½. Scales 35.

Compressed. Interorbital a little convex; snout pointed; lower jaw very slightly included; mouth horizontal; maxillary not nearly to under front of eye; with 2 barbels, the terminal somewhat the longer; gill cover with faint striæ, radiating downward and backward; gill-membranes joined to sides of isthmus under edge of preopercle. Dorsal and anal with stout spines, barbed behind, that of the dorsal strongly, of the anal weakly so; the dorsal especially with a soft tip; axils of dorsal and anal apposed; dorsal origin equidistant from tip of snout and base of caudal, over center of ventral base; pectoral and ventral rounded; pectoral passing ventral origin; ventral reaching two-thirds distance to anal; caudal well forked with broad pointed lobes. Scales rather rough with faint radiating striæ; lateral line complete, slightly bent down, in the center of peduncle.

Dark; scales with narrow dark edges; paler on lower surfaces; fins dusky. Several specimens of which this is one of the smaller.

Carassius Nilsson

Nilsson, 1832, 'Prodromus Ichthyologiæ Scandinaviæ.' IV, p. 290. Type: *Cyprinus carassius* L.

Anal as well as dorsal with a serrate spine; dorsal long; no barbels; teeth in one row, compressed.

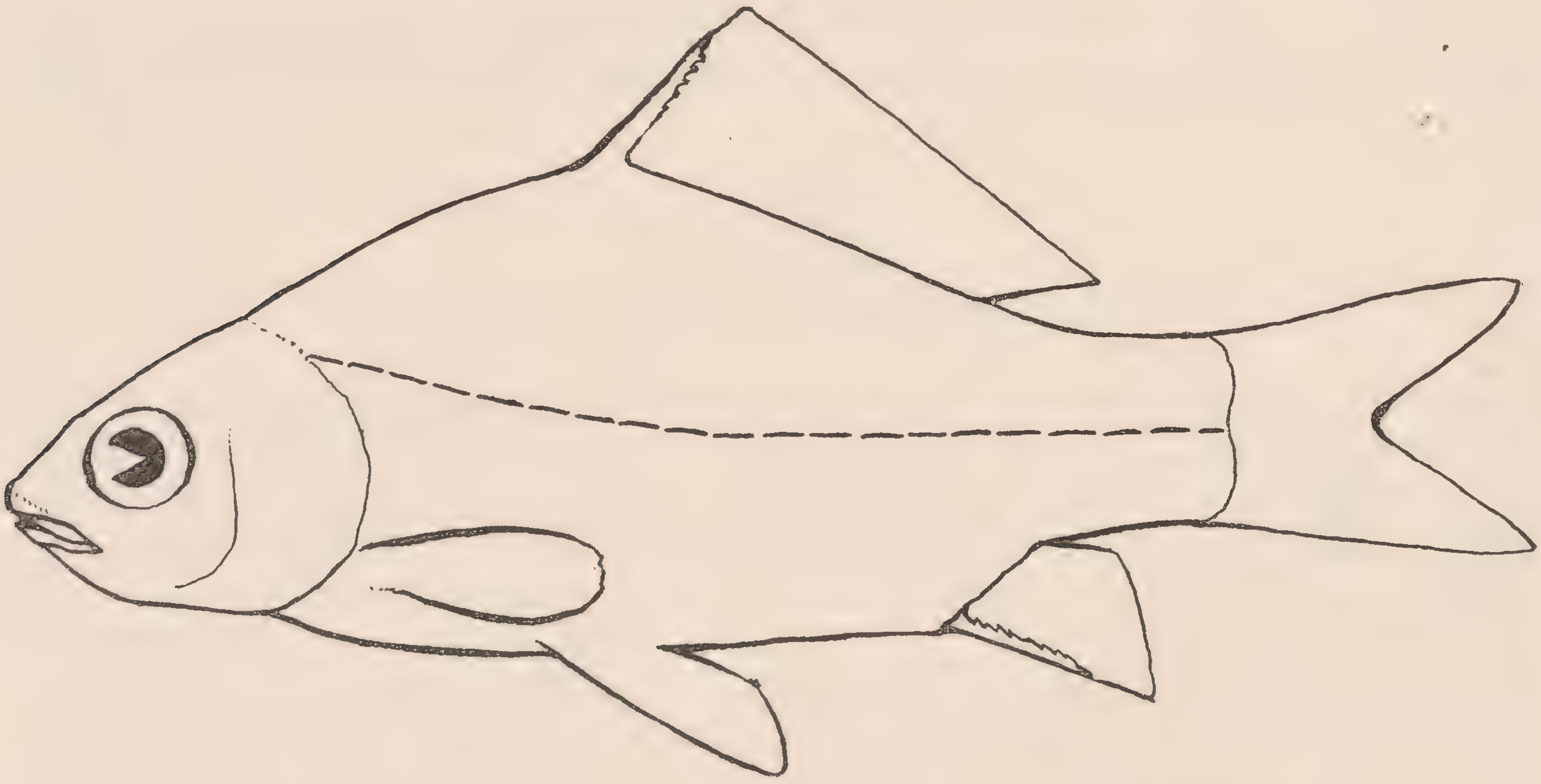

Fig. 20. *Carassius auratus* (Linnæus). 83 mm. without caudal.

Carassius auratus (Linnæus)

Cyprinus auratus Linnæus, 1758, 'Syst. Nat.,' 10th Ed., I, p. 322

Description of a specimen from Nodoa, Hainan:

Length to base of caudal 80 mm. Depth in length 2.4; head 3.2. Eye in head 3.6; snout 3.6; interorbital 2.7; maxillary 3.2; pectoral 1.5; ventral 1.4; caudal lobe 1; dorsal spine 1.6; anal spine 1.8; depth of peduncle 1.8.

Dorsal II, 18; anal II, 5½. Scales 29.

Mouth small, lower jaw slightly the shorter. First spine of dorsal and anal rudimentary, the last stout and serrate behind. Pectoral reaches front of ventral, ventral not to anal. Color brownish.

Description (for comparison) of a small specimen from Tungting Lake, Hunan, December 25, 1921. Length to base of caudal 99 mm. Depth in length 2.4; head 3.6. Eye in head 3.4; snout 3; interorbial 2.5; maxillary 3.1; pectoral 1.5; ventral 1.3; caudal lobe 1; dorsal spine 1.6; anal spine 1.7; depth of peduncle 1.7.

Dorsal II, 20; anal II, 5. Lateral line 28.

Mouth small, jaws equal. First spine of dorsal and anal rudimentary, the last stout and serrate behind. Pectoral reaches front of ventral, ventral not to anal. Color brownish.

In life the upper margin of the Hainan gold-fish's eye is red. In this respect Hainan examples differ from the northern ones.

Gobioninæ[1]

The gudgeons are a numerous and variable Eurasian group or series tending towards elongate forms, strictly inferior mouth with free, more or less papillose or striate lips, vent placed well forward towards ventral axil, small scales, naked breast. They are characterized by a single, well-developed pair of barbels at the end of the maxillary, rarely absent, and we know of no case where the anterior pair, characteristic of the Cyprininæ, is present. The dorsal spine, the presence or absence of which is of so little moment in the Cyprininæ, is with the Gobioninæ present only in the aberrant genus *Hemibarbus* (and *Acanthogobio*), where it is strong and smooth. *Hemibarbus* is placed outside this group and close to *Barbus* by some authors. The above-mentioned gobionin tendencies are variously present or absent in each of the many species and form an unsatisfactory basis for their separation into genera. The most primitive gudgeons, if they stood alone, might well enough be classed with the Cyprininæ.

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[1] While this paper is in press several specimens of a minnowlike gudgeon from Nodoa have been referred to the genus *Gnathopogon* as follows:

Gnathopogon atromaculatus, new species

Length to base of caudal (of type, No. 8442, Amer. Mus. Nat. Hist.) 54 mm. Depth in length 4.2; head 3.5. Eye in head 2.8; snout 3.5; interorbital 3.4; maxillary 3.7; width of mouth 3.3; barbel 3: width of body (at shoulder) 2; depth of peduncle 2.6; its length 1.5; pectoral 1.5; ventral 1.7; longest dorsal ray 1.3; longest anal ray 1.7; caudal lobe 1.

Dorsal 9; anal 8. Scales 36.

Moderately compressed; breast and belly rounded; vent at ⅜ the distance from anal origin to ventral axil. Interorbital slightly concave; eye large, oval, slightly superolateral; snout broad, sharp, soft (apparently an age character); upper jaw protractile; maxillary slightly oblique not reaching to under front of eye; lower jaw without free lip, distinctly included; a subterminal barbel, very slender distally; gill-membranes joined to isthmus under posterior margin of eye. Dorsal and anal without spinous rays; dorsal origin slightly nearer tip of snout than tip of depressed anal; pectoral reaching more than ⅔ the distance to ventral; ventral ⅔ to anal; caudal well forked with narrow pointed lobes. Scales thin; body completely scaled; lateral line complete, dipping slightly in front, in the center of peduncle.

Pale. Some black marking along base of dorsal, particularly a black spot at its origin; a faint dark stripe in the center of peduncle, rising above lateral line over ventral; a short dark stripe behind the vent; a faint dark shade at the base of each caudal lobe. Smaller specimens have the scales of back slightly outlined in dark, peduncular stripe bolder, marking along lateral line as in *G. wolterstorffi* sometimes faintly indicated. The spot at dorsal origin is constant.

Though an indefinite group baffling definition, the Gobioninæ as here understood (with the exception of *Sarcocheilichthys*, which we have been tempted to place in the Cyprininæ) may be rather easily referred to two or three parallel basally approximate phyla. The forms are most numerous in central China but do not extend into the Indies and apparently form a much smaller part of the Hainan fauna than of the fauna at any point on the mainland to the north.

SARCOCHEILICHTHYS Bleeker

BLEEKER, 1859, Nat. Tijdschr. Ned. Ind., XX, p. 435. Type: *Leuciscus variegatus* Temminck and Schlegel.

The type of *Sarcocheilichthys* is Japanese. In dealing with related mainland forms, Berg retains *Sarcocheilichthys* for *S. sinensis* and its allies, and proposes *Chilogobio* Berg for the others. But *S. variegatus* appears to be more closely related to *Chilogobio* than to *S.* (*sinensis*) *lacustris* figured by him. We believe that three subgenera should be recognized including *Barbodon* Dybowski with *Barbodon lacustris* Dybowski as type.

Subgenus **CHILOGOBIO** Berg

BERG, 1914, 'Faune de la Russie, Poissons,' III, part 2, p. 488. Type: *Chilogobio sotdatovi* Berg = *Georgichthys* NICHOLS, 1918, Proc. Biol. Soc. Wash., XXXI, p. 17.

Small fishes with a general resemblance to *Barbus*. No barbels; mouth small, somewhat inferior; lower jaw with a narrow shaft, expanded at the tip, conspicuous lips stopping at its sides. Vent in an intermediate position between ventral axil and anal origin. Scales about 40, lateral line complete, straight, in the center; a single row of pharyngeal teeth. Several closely realted forms in eastern Asia.

This subgenus is closely related to *Barbodon* (subgenus) which has a more gobioninoid form, a minute barbel at the end of the maxillary, and horny tip to the lower jaw, and it has likely at times been mistaken for the young of same. We had in mind the possibility of its being such until convinced of its distinctness by comparable material (same size) of each from Tungting Lake, Yang-tze.

Sarcocheilichthys hainanensis, new species

Plate XXVI, Figure 3

DESCRIPTION OF TYPE.—Number 8370, American Museum of Natural History. Locality: Nodoa, Hainan, July 28, 1923. Length to base of caudal 62 mm. Depth in length 4.0; head 4.0. Eye in head 3; snout 3; interorbital 3; maxillary 3.7; length of peduncle 1; depth of peduncle 1.8; pectoral 1.1; ventral 1.3; longest dorsal ray 1; longest anal ray 1.5; caudal lobe 1.

Dorsal 9; anal 9; scales 40.

Body moderately compressed. Mouth protractile, small, curved, inferior, with thick smooth lips, those of the lower jaw at base only, completely separated by narrow shaft and expanded tip of same; maxillary barely reaching front of orbit; gill-membranes united to isthmus, distance between the slits less than half eye. Dorsal with its anterior rays neither stiffened nor thickened; center of its base equidistant from front of eye and base of caudal; pectoral extending not quite to ventral; ventral falling far short of anal, and anal of caudal; ventral inserted a little behind dorsal origin; caudal well forked. Scales with somewhat roughened surface and close-set parallel or subparallel horizontal striæ; lateral line complete.

Dark along back and irregularly dark along middle of side, with an elevated dark blotch or area under dorsal; dorsal with a black vertical streak in front and behind; caudal with black stripes in center of lobes; ventral and anal with broad black central cross-blotches, and pectoral with a fainter linear black spot along the upper edge. A color sketch from life is as follows: midline of back dusky, sides straw-yellow, lower parts silvery white; a narrow dusky stripe in the middle of the side from the head to the base of the caudal fin, scattered scales along this stripe and irregularly above it especially below dorsal, black; fins pale, the front, and posterior corner of the dorsal, center of caudal lobes, band across ventral and anal and a rather faint mark along upper pectoral rays, black.

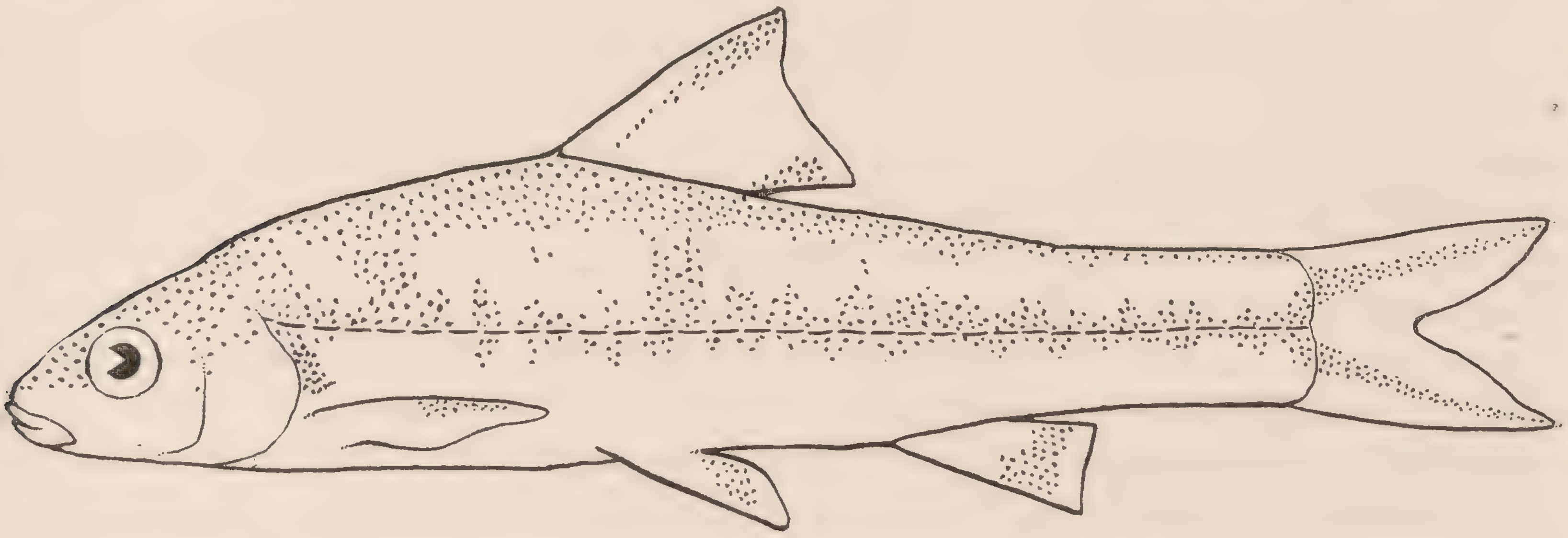

Fig. 21. *Sarcocheilichthys hainanensis*, type. 62 mm. without caudal.

This is a rare fish about Nodoa. We saw only three or four examples: one was taken in the small stream that rises just northeast of Nodoa.

Chilogobio appears to be one of the commonest and most widely distributed groups of small fishes in China. Berg has given an analysis of the genus (subgenus) wherein he recognizes six forms: *czerskii* Berg, Lake Chanka; *soldatovi* Berg, Amur; *sciistius* (Abbott), Chihli; *nigripinnis* (Günther), Shanghai; *imberbis* (Sauvage and De Thiersant), Shensi; *nitens* (Günther), Shanghai. From the type description of *nitens* we are convinced that it is not a closely related fish, and should be excluded from *Chilogobio* and *Sarcocheilichthys* altogether. On the other hand, *scaphignathus*, type of the genus *Georgichthys* Nichols (1918, Proc. Biol. Soc. Wash., XXXI, p. 17), is a *Chilogobio*. In addition to *nigripinnis* from Anhwei, *scaphignathus* from Fukien, and the present species, Hainan, our Chinese collections contain another undescribed form from Tungting Lake, middle Yang-tze, so comparatively closely allied to *soldatovi* and *sciistius* on the one hand and *nigripinnis* on the other that the four may best be considered subspecies. This Yang-tze fish may stand as follows.

Sarcocheilichthys nigripinnis tungting, new subspecies

Description of Type.—Number 8387, American Museum of Natural History. Locality: Huping, Tungting Lake, Hunan. Length to base of caudal 80 mm. Depth in length 3.9; head 4. Eye in head 4; snout 3.5; interorbital 3; maxillary 3.3; width of mouth 4; width of body 1.8; depth of peduncle 2; its length 1.5; pectoral 1.4; ventral 1.6; longest dorsal ray 1.1; longest anal ray 1.7; caudal lobe 1.1.

Dorsal 9; anal 8. Scales 42.

Moderately compressed; the back somewhat elevated; breast broadly rounded; vent a little nearer anal origin than to ventral axil. Interorbital flattish, very slightly convex; snout bluntly pointed; mouth nearly horizontal, transverse, curved; upper jaw protractile; lower jaw included; maxillary not reaching to under front of eye; no barbels; sides of snout and cheeks with small scattered, poorly developed warty prominences; gill-membranes broadly joined to isthmus behind edge of preopercle. Dorsal and anal without spinous rays; dorsal origin equidistant from snout and anal axil; ventral origin under center of dorsal base; pectoral rounded, not reaching ventral, ventral not reaching anal; caudal moderately forked with bluntly pointed lobes. Scales rough with subparallel slightly radiating striæ; lateral line complete, in center, rising very slightly to meet opercle.

A black oblique bar immediately behind opercle; sides with many irregular dark cross blotches, and slight tendency for these to form a lateral stripe. Fins dusky grayish more or less uniform, the ventral and anal darker with pale edges.

A number of specimens, of which the type is one of the largest. Smaller ones have a definite blackish lateral stripe; one of 50 mm. colored much as typical *nigripinnis* from Anwhei but in most the fins are more uniform. *Barbodon* from the same locality compared down to a smaller size than this specimen, readily separated from it by blunter head, less compressed body, horny tip of lower jaw, small barbel, and different color.

Pseudogobio maculatus Günther (1888, Ann. Mag. Nat. Hist., p. 432) from farther up the Yang-tze seems to be a *Chilogobio*, not a *Barbodon* as supposed by Berg; but, from color, close to *czerskii* and *scaphignathus* rather than the *nigripinnis* group.

Analysis of *Chilogobio*

1.—Slender (depth less than head); ventral under first third versus middle of dorsal.
S. (*Chilogobio*) *imberbis* (Sauvage and De Thiersant).
Not as above...2.
2.—Lower fins pale, unmarked; scales 39 to 40; depth 3.7 to 3.8; eye 3.4 to 3.6; length of peduncle 1 to 1.1; dark mark on front of dorsal, dark center to caudal lobes. Ventral origin before center of dorsal base................3.

Lower fins grayish, dusky, or largely occupied by blackish blotches; scales 38 to 42; depth 3.9 to 4.2; eye 3.7 to 4; length of peduncle 1.1 to 1.7; dorsal dusky more or less darker before and behind, or with extensive black marks before and behind and a pale center; marks on caudal lobes obscure or absent. Ventral origin about under center of dorsal base.
S. (*Chilogobio*) *nigripinnis* (Günther)....................................4.

Body and fins pale with sharp blackish marks, such on front and back of dorsal, center of lower fins, center of caudal lobes; scales 40; depth 4; eye 3; length of peduncle 1. Ventral origin before center of dorsal base.
S. (*Chilogobio*) *hainan* Nichols and Pope.

3.[1]—Mouth slightly oblique; pectoral 1.4..............*S.* (*Chilogobio*) *czerskii* Berg.

Mouth horizontal; pectoral 1...........*S.* (*Chilogobio*) *scaphignathus* (Nichols).

4.—Length of peduncle 1.1; scales 39 to 41; depth 4 to 4.2; dorsal dusky; body dark with conspicuous blackish bar behind head.......*S.* (*C.*) *n. soldatovi* Berg.

Length of peduncle 1.3 to 1.5; scales 38 to 42; depth 3.9 to 4.5; dorsal darker before and behind; body dark with more or less conspicuous blackish bar behind head..5.

Length of peduncle 1.7; scales 38; depth 4.1; dorsal black before and behind; pale in center; lower fins largely covered with dark blotches.
S. (*C.*) *n. nigripinnis* (Günther).

5.—Dorsal origin equidistant from tip of snout and middle of peduncle; depth 4 to 4.5; scales 38 to 40; length of peduncle 1.3; pectoral 1.3.
S. (*C.*) *n. sciistius* (Abbott).

Dorsal origin equidistant from tip of snout and anal axil; depth 3.9; scales 42. length of peduncle 1.5; pectoral 1.4....*S.* (*C.*) *n. tungting* Nichols and Pope.

HEMIBARBUS Bleeker

BLEEKER, 1859, 'Conspectus syst. Cyp.,' Nat. Tijdschr. Ned.-Ind., XX, p. 431. Type: *Gobio barbus* Temminck and Schlegel.

Moderately elongate, head below and breast moderately flattened; tip of snout somewhat expanded, with a dent behind it; eye large, placed high, very slightly superolateral; mouth inferior, with thick lips; a single pair of barbels at the end of the maxillary; vent immediately before anal origin; dorsal with a long stout smooth spine. Teeth 3-rowed, 5, 2 or 3, 1.

Hemibarbus labeo (Pallas)

Cyprinus labeo PALLAS, 1776, 'Reise,' III, pp. 207, 703.

Description of a specimen from Nodoa, Hainan:

Length to base of caudal 131 mm. Depth in length 4.3; head 3.3. Eye in head 4; snout 2.3; interorbital 4; maxillary 2.7; dorsal spine 1.2½; pectoral 1.1; ventral 2; longest anal ray 1.9; caudal lobe 1.3; depth of peduncle 3.3; its length 1.9. Barbel in eye 2.

Dorsal II, 7; anal 8. Scales 47.

---

[1] *S.* (*C.*) *maculatus* (Günther) probably comes here. Depth 4; head 4; pectoral slightly less than head; scales 41; interorbital as wide as orbit.

Moderately compressed, the back little elevated; vent immediately before anal; head below and breast moderately flattened; the ventrals but not the pectorals in a horizontal plane. Snout pointed, its tip expanded with a dent behind well in advance of nostril; eye placed high, very slightly superolateral; mouth inferior, with rather thick lips, the lower jaw decidedly the shorter; a slender barbel near the end of the maxillary; interorbital very slightly concave; gill-membranes joined to isthmus under edge of preopercle. Last simple dorsal ray a long strong smooth spine, extending approximately to the tip of the fin; dorsal origin appreciably nearer tip of snout than base of caudal; ventral base under middle of dorsal; pectoral not quite reaching ventral; ventral not nearly reaching anal; caudal strongly forked with even pointed lobes. Lateral line complete, dipping slightly in front, running straight in center of tail.

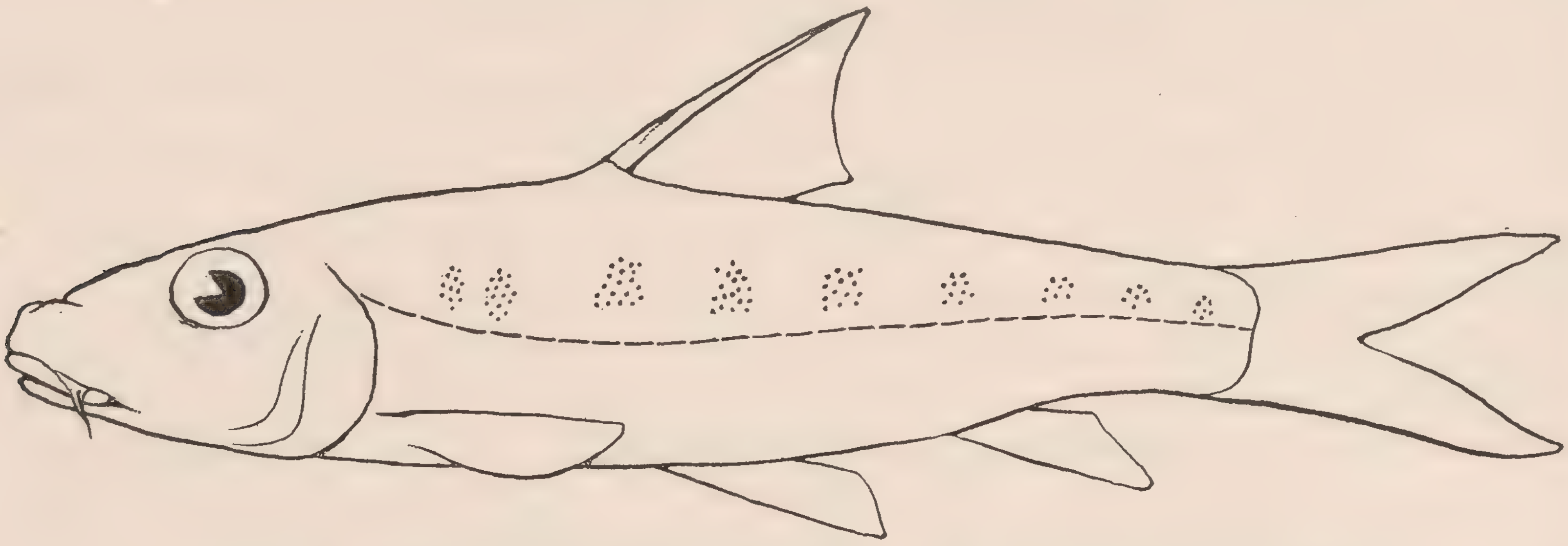

Fig. 22. *Hemibarbus labeo* (Pallas). 131 mm. without caudal.

Brownish; darker along the back; about 9 small blackish marks along side above lateral line; fins unmarked.

PSEUDOGOBIO Bleeker

BLEEKER, 1860, Prodr. Cypr., p. 215. Type: *Gobio esocinus* Temminck and Schlegel.

Short-bodied or moderately elongate, little compressed, more or less flattened on the breast; tip of snout usually marked off by a dent behind it; eye superolateral; mouth inferior; lips thick, free behind across chin, corrugated papillose; a barbel at the end of the maxillary; vent nearer ventral axil than to anal origin; breast naked. A main row of 5 teeth, sometimes 1 tooth in a second row. Scales in lateral line less than 45.

Pseudogobio kachekensis Oshima

Pseudogobio kachekensis OSHIMA, 1926, Annot. Zool. Japon., XI, p. 13. Kachek River, Hainan.

Length 62 mm. Depth in length, 6.4; head 4.25. Snout in head 2.4; eye 3. Dorsal rays 10; anal 8. Scales 34. Back indistinctly maculated with black; dorsal and caudal grayish; the rest of the fins whitish.

From the description this species is closer to *P. fukiensis* Nichols (1926, Amer. Mus. Novit., No. 224, p. 5, fig. 4) than to *P. labeoides* from Nodoa. It is slenderer than the former.

Pseudogobio labeoides, new species

This fish bears a superficial resemblance to *Hemibarbus labeo.*

Description of Type.—Number 8372, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 90 mm. Depth in length 4.8; head 3.4. Eye in head 3.7; snout 2; interorbital 5; maxillary 2.6; greatest width (at back of head) 1.9; depth of peduncle 3.5; its length 2; pectoral 1.3; ventral 1.8; longest dorsal ray 1.4; longest anal ray 2; caudal lobe 1.3; Barbel in eye 1.5.

Dorsal 9; anal 8. Scales 40. Teeth compressed, with a slight hook and pronounced shoulder.

Little compressed; head somewhat cuboid, broader beneath than above; vent more than twice as distant from anal origin as from ventral axil. Snout long and somewhat pointed, its end marked off by a dent before the nostril; upper jaw protractile downward; lower jaw much included; maxillary not reaching to opposite front of eye; lips loose, corrugated-papillose, free behind across the chin; a small subterminal maxillary barbel; eye superolateral; interorbital a little concave; orbit with free rim and narrow membranous lids; gill-membranes joined to isthmus under hind border of eye. Dorsal and anal without spinous rays; dorsal origin equidistant from tip of snout and tip of last anal ray; ventral origin under middle of dorsal base; pectoral reaching ventral origin; ventral ⅔ to anal; caudal moderately forked. Scales with close-spaced slightly radiating striæ; no scales on breast before pectoral axil; lateral line complete, straight in the center, rising a little in front to meet opercle.

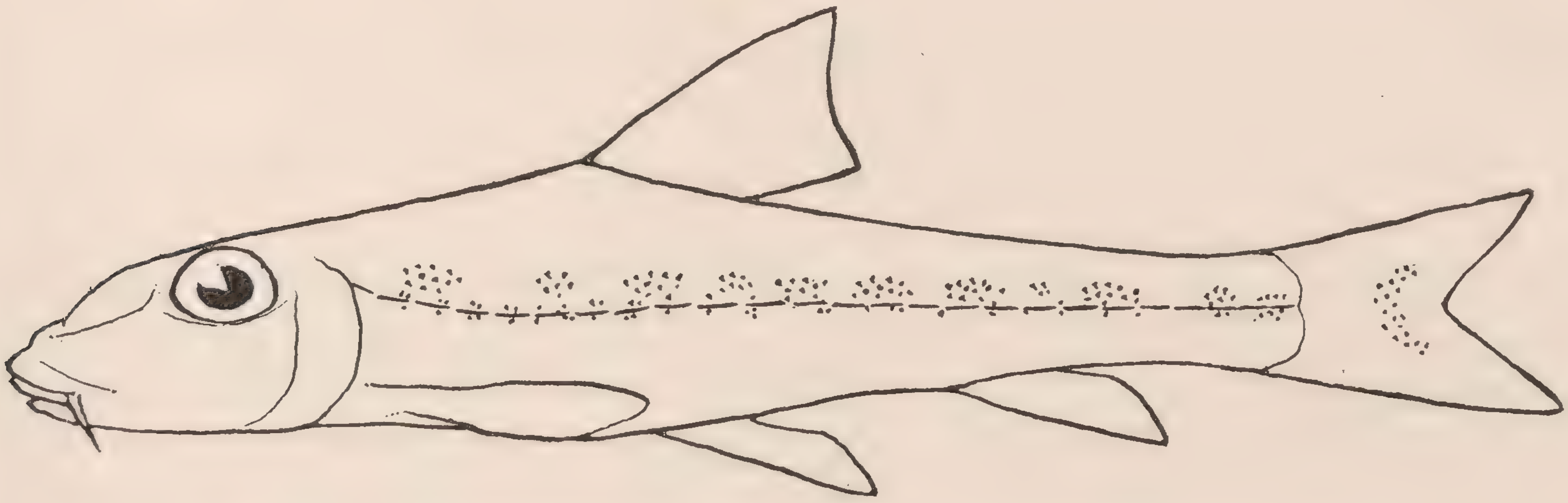

Fig. 23. *Pseudogobio labeoides*, type. 90 mm. without caudal.

Color pale, a series of small faint dark blotches along middle of side mostly above lateral line, with tendency to confluence; small blackish spots here and there along lateral line; back with a few spots and marks; short dark stripes forward from nostril meeting on snout; a small dark spot above pectoral axil; faint curved dark bar on caudal, fins otherwise plain.

Xenocypridinæ

Members of the genus *Xenocypris* are slender, free-swimming fishes, not unlike certain of the Abramidinæ in contours, but with a peculiar inferior transverse mouth. We are of the opinion that this mouth is a relic which they have from ancestral bottom-living fishes such as *Garra*, and include *Garra*-like and *Xenocypris*-like forms in a distinct subfamily.

GARRA Hamilton-Buchanan

HAMILTON-BUCHANAN, 1822, 'Fishes of the Ganges,' p. 393. Type: *Cyprinus lamita* Hamilton-Buchanan.

Little or moderately compressed; mouth inferior, transverse, curved; usually 1 or 2 pairs of barbels, sometimes absent; dorsal without a spine; gill-membranes broadly and conspicuously united to isthmus, a suctorial disc on the chin, free behind.

Garra imberbis (Vinciguerra)

Discognathus imberbis VINCIGUERRA, 1890, Ann. Mus. Genov., (2) IX, p. 277, Pl. IX, fig. 7. Karenge Hills, Burma.

Discognathus imberbis BOULENGER, 1899, Proc. Zoöl. Soc. London, pt. 2, p. 961.

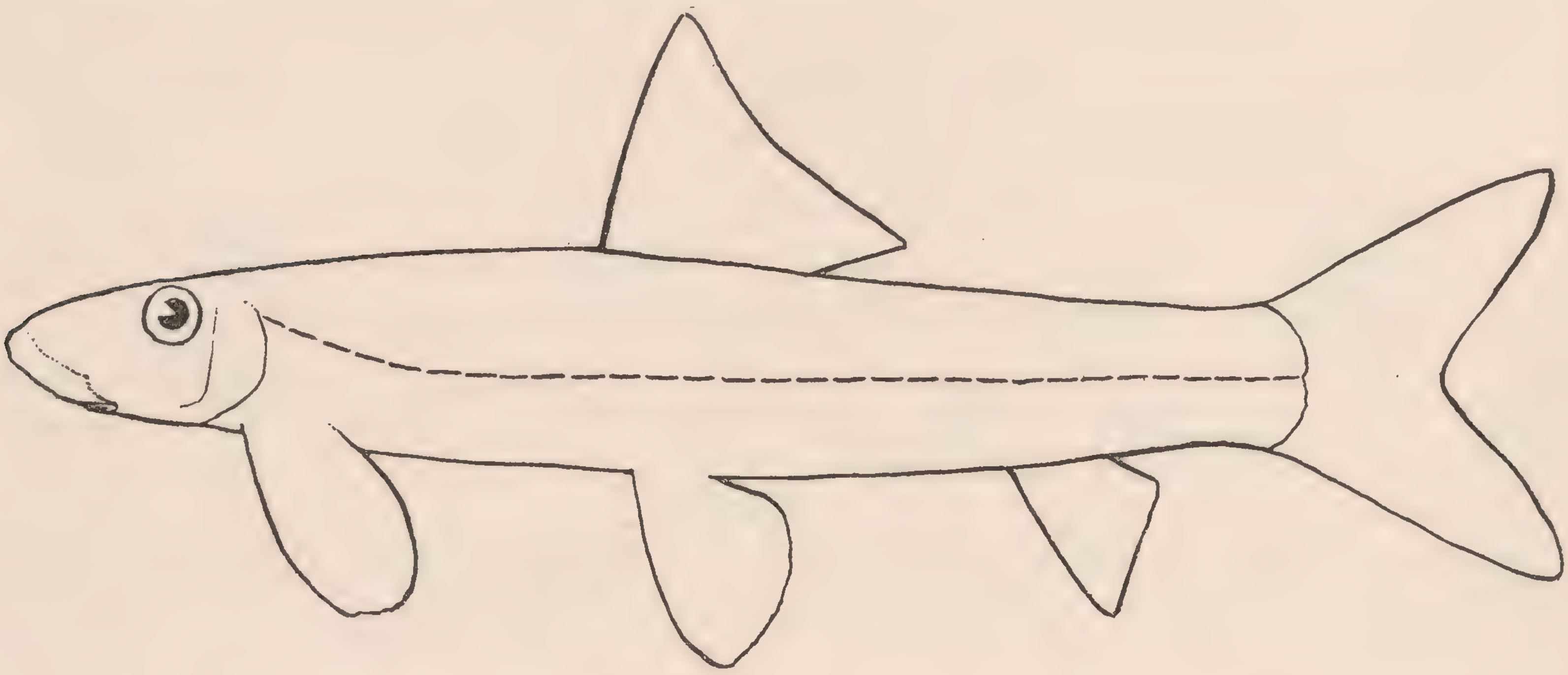

Fig. 24. *Garra imberbis* (Vinciguerra) after Vinciguerra.

Depth 5⅔ to 6¾, head 4½ to 5½ in length of body. Width of head about 1⅓ in its length. Eye small, 2¼ to 2½ in length of snout, 2 to 2½ in interorbital. No barbels. Dorsal 11; anal 7; lateral line 44. Teeth 5,4,1.

Boulenger lists this fish from Hainan. There is a possibility that he has confused it with *Varicorhinus discognathoides* Nichols and Pope, which it certainly is not.

Garra schismatorhyncha, new species

DESCRIPTION OF TYPE.—Number 8373, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 108 mm. Depth in length 4.5; head 4.1. Eye in head 4.6; snout 2; interorbital 2.7; maxillary 2; width of mental disk 2.1; depth of peduncle 1.9; its length 1.6; pectoral 1; ventral 1.2; longest dorsal ray 1; longest anal ray 1.4; caudal lobe 0.8. Barbels in eye 1.9.

Dorsal 10; anal 7. Scales 33.

Moderately compressed; top of head flat; lower surface of head breast and belly flat so that pectorals and ventrals are in a horizontal plane; vent something more than twice as far from ventral axil as from anal origin. Forehead ending in a triangular projection, beneath which a deep re-entrance, and there is also a more anterior groove across lower level of snout; tip of forehead and top of snout with small horny warts; mouth transverse on lower surface of head about half-way between tip of snout and eye; overhung in front by membrane of lower surface of snout which has a finely papillose margin and regularly and rather finely notched edge; smooth chin and surrounding semicircular finely papillose lip forming a large disk, at the corner of which there is a small maxillary barbel, about the same length as a small barbel at side of lower surface of snout; eye placed high, almost strictly lateral; gill-membranes conspicuously joined to isthmus on lower surface of head under posterior edge of eye; maxillary to under front of eye. Dorsal and anal without spines; dorsal origin equidistant from tip of snout and anal axil; ventral beneath the middle of dorsal; pectoral not reaching ventral, ventral not reaching anal; caudal forked, the lobes about equal. Scales rough, with fine parallel horizontal striæ; lateral line complete, straight, in the center; large scales running well out on caudal base.

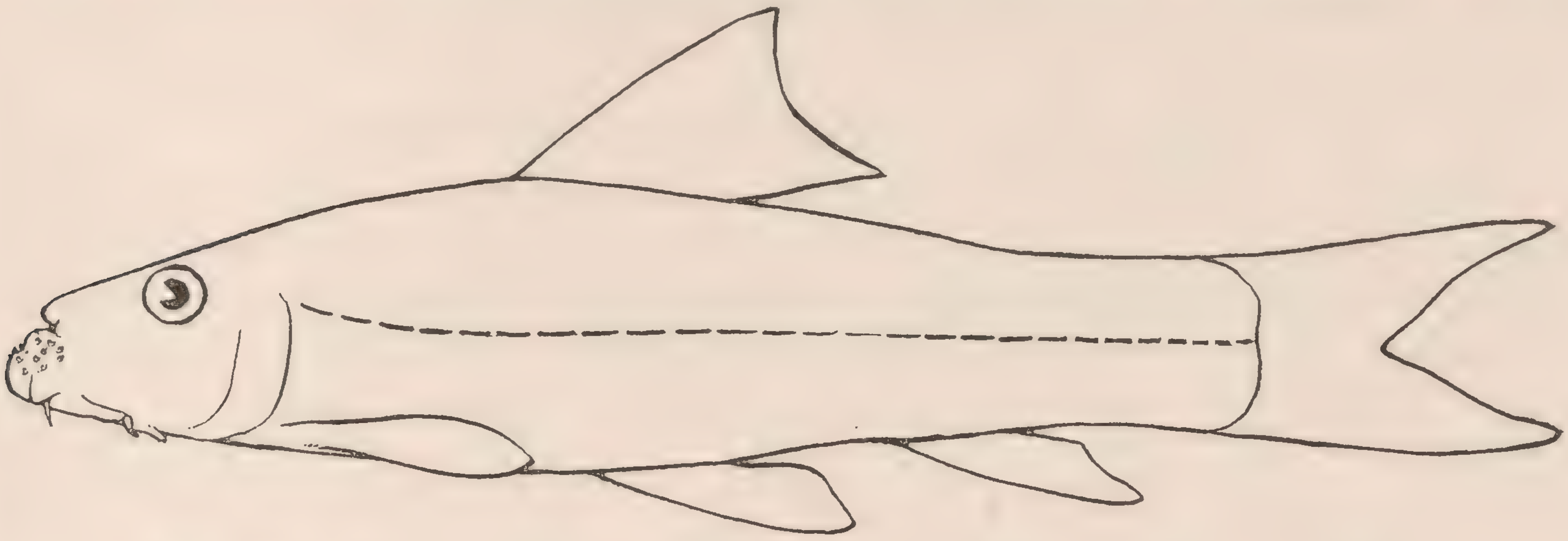

Fig. 25. *Garra schismatorhyncha*, type. 108 mm. without caudal.

Color brownish; top and sides of head darker; as also an area on the end of the pectoral toward the inside, and distal outer margins of caudal.

Schismatorhynchos heterorhynchos of Sumatra and Borneo is deeper-bodied, with barbels shorter relative to the eye, and upper caudal lobe decidedly longer than the lower. Otherwise it resembles this species closely in appearance, but *G. schismatorhyncha* has a *Garra* mouth; unlike that figured for *S. heterorhynchos*.

G. schismatorhyncha was not a common fish in Hainan, for we got only two or three specimens. They were taken in the cascades of the river that flows three miles southwest of Nodoa.

VARICORHINUS Rüppell

RÜPPELL, 1836, Museum Senckenberg, II, p. 14. Type: *Varicorhinus beso* Rüppell = *Labeo varicorhinus* Cuvier and Valenciennes. BERG, 1916, 'Les Poissons des Eaux Douces de la Russie,' p. 244.

Free-swimming fishes with inferior mouth, less curved, more strictly transverse than in *Garra*; lower jaw coming to a sharp, cartilaginous edge; without free sucking disc at the chin; usually one or two pairs of small or minute barbels; dorsal without a developed spine. Vent immediately before anal origin. Berg unites *Gymnostomus* and other genera under the comprehensive genus *Varicorhinus*. This may doubtless be apportioned into various subgenera to advantage, and our Hainan species appears to differ subgenerically from barbelled mainland forms. Many species and several generic names of long standing are involved.

Varicorhinus discognathoides, new species

Description of Type.—Number 8389, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 225 mm. Depth in length 3.6; head 4.6. Eye in head 6; snout 2.3; interorbital 2.3; maxillary 2.1; width of mouth 2; width of body 1.4; depth of peduncle 1.5; its length 1.4; pectoral 1; ventral 1.1; longest dorsal ray 1; upper caudal lobe 0.6; distance between gill clefts 4.5.

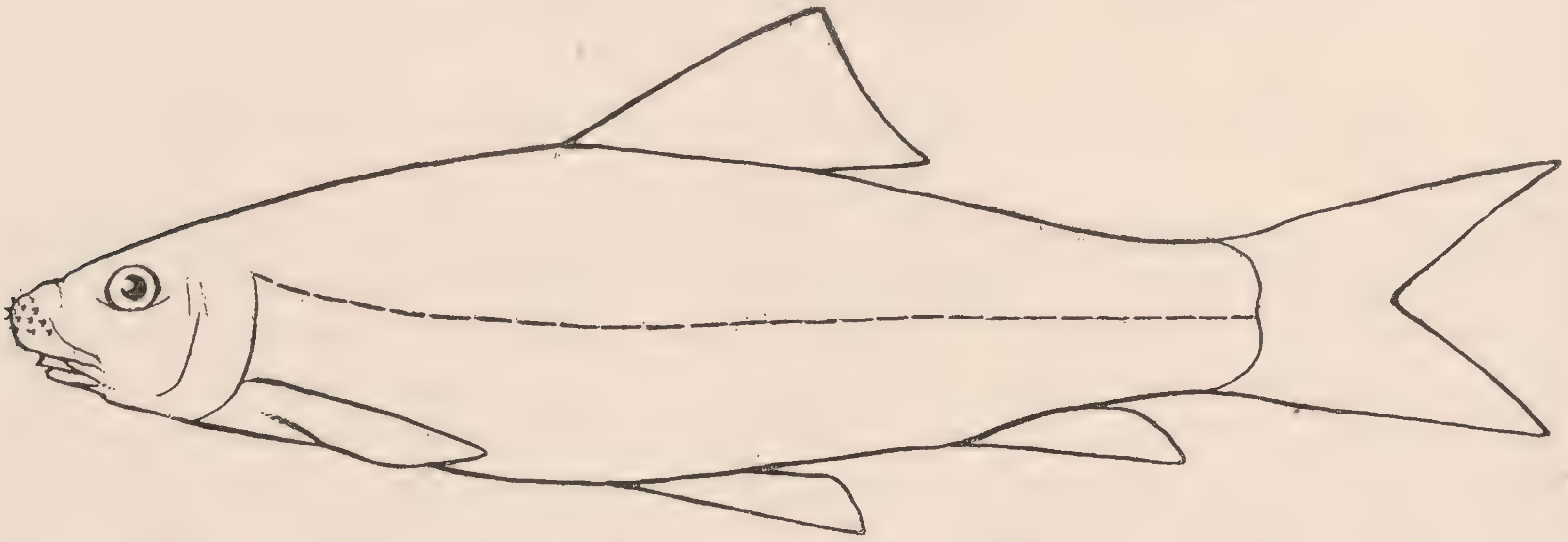

Fig. 26. *Varicorhinus discognathoides*, type. 225 mm. without caudal.

Dorsal 12; anal 7. Scales 39. Teeth in 3 rows 5, 4, 2, not hooked, some of them truncate.

Compressed, front of back slightly elevated; vent almost immediately before anal origin. Head bluntly pointed, its top and lower surface flattish, the snout squarish. Tip of snout slightly gibbous, marked off by a transverse crease above; with a cross-band of small horny warts; mouth inferior, semicircular transverse; no barbels; maxillary slightly produced in a rounded point which reaches to under anterior margin of eye; free edges of vertical hanging snout membrane and upper lip slightly dented; lower jaw ending in a smooth curved leathery horizontal edge; lower lip papillose, broadly free in front and narrowly so behind; eye placed high, almost strictly lateral; with a free rim; gill-membranes broadly joined to side of breast under corner of preopercle. Dorsal origin equidistant from tip of snout and middle of peduncle; ventral under middle of dorsal base; pectoral reaching $\frac{3}{5}$ distance to ventral; ventral $\frac{5}{7}$ to anal; caudal moderately forked, the upper lobe the more pointed and slightly the longer. Scales rough with close set almost horizontal subparallel striæ; lateral line complete, in the center, rising a little in front.

Dark, a little paler below; fins dusky.

ONYCHOSTOMA Günther

GÜNTHER, 1896, Ann. Mus. Zoöl. St. P., pt. 1, p. 211, Pl. I, fig. *b*. Type: *Onychostoma laticeps* Günther.

This genus differs from *Varicorhinus* in having a serrate dorsal spine.

Onychostoma leptura (Boulenger)

Gymnostomus lepturus BOULENGER, 1899, Proc. Zoöl. Soc. London, pt. 2, p. 961.

Description based on a specimen 125 mm. long to base of caudal from Nodoa:

Depth in length 4; head 4.5 (to 5). Eye in head 3.3; snout 2.5 (to 3.5); interorbital 2.4; maxillary 2.5; width of mouth 2.4; depth of peduncle 2.5; its length 1.2; pectoral 1.2; ventral 1.2; longest dorsal ray 1.3; longest anal ray 1.4; caudal lobe 0.6.

Dorsal 10; anal 7 (or 8). Scales 46 (to 49). Teeth 3-rowed, 4, 4, 2, loosely attached, with bluntly pointed tips.

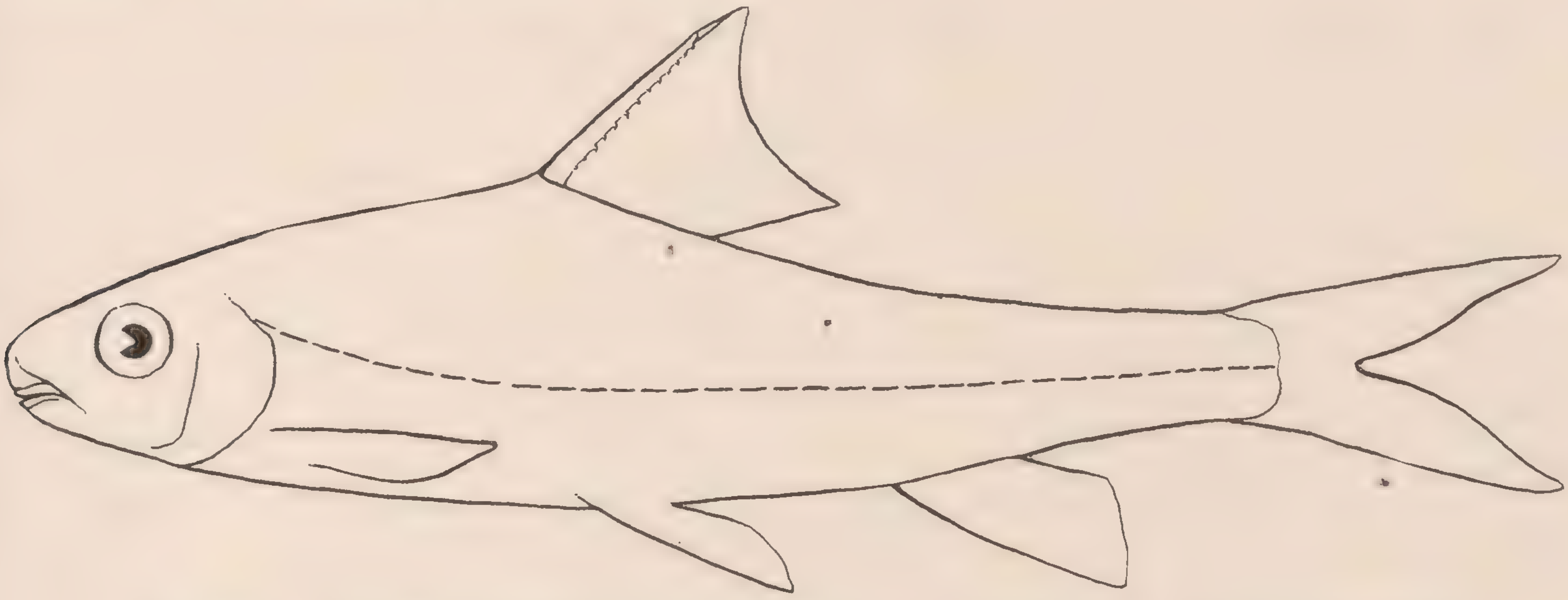

Fig. 27. *Onychostoma leptura* (Boulenger). 135 mm. without caudal.

Moderately compressed; head short and blunt; lower surface of snout and lower jaw flat; upper jaw protractile; maxillary horizontal, to under front margin of eye; no barbels. Mouth inferior, straight across, without free lips; edge of lower jaw thin, leathery, red-brown; edge of snout with three conspicuous horny warts in center, a smaller one at each side; gill-membranes united to breast under edge of preopercle. Last simple dorsal ray stiffened (spinous) for most of its length, concave behind with sheathed barbs at the edges, and with a soft tip; center of dorsal base equidistant from front of eye and base of caudal, situate over anterior rays of ventral; pectoral not reaching ventral, ventral not reaching anal; caudal deeply forked, the lobes equal. Scales rough-pimply, with inconspicuous radiate striæ; lateral line complete; dipping slightly anteriorly, otherwise straight and in the center of side.

Dark above; paler below; scales of back and sides conspicuously outlined with dark.

This *Onychostoma* agrees in general so well with Boulenger's figure of *Gymnostomus lepturus* that we have little hesitation in referring it to that species. Boulenger does not describe or figure the serrate dorsal spine, which is less strong than in *O. laticeps*.

LABEO Cuvier

CUVIER, 1817, 'Regne Animal,' II, p. 194. Type: *Cyprinus niloticus* (Forskal) Geoffroy.

The species described here is related to *Labeo garnieri* Sauvage, 1884, Tonkin and *Labeo jordani* Oshima, 1919, Formosa. With them it might perhaps as well be placed in the heterogeneous genus *Varicorhinus* or stand apart as a distinct genus.

Labeo collaris, new species

DESCRIPTION OF TYPE.—Number 8399, American Museum of Natural History, Locality: Nodoa, Hainan. Length to base of caudal 202 mm. Depth in length 2.9; head 4.7. Eye in head 3.6; snout 2.7; interorbital 1.9; maxillary 3.5; width of mouth 2.6; greatest width of body 1.5; depth of peduncle 1.5; its length 1.4; pectoral 1.1; ventral 1; longest dorsal ray 0.7; longest anal ray 1.3; upper caudal lobe 0.5.

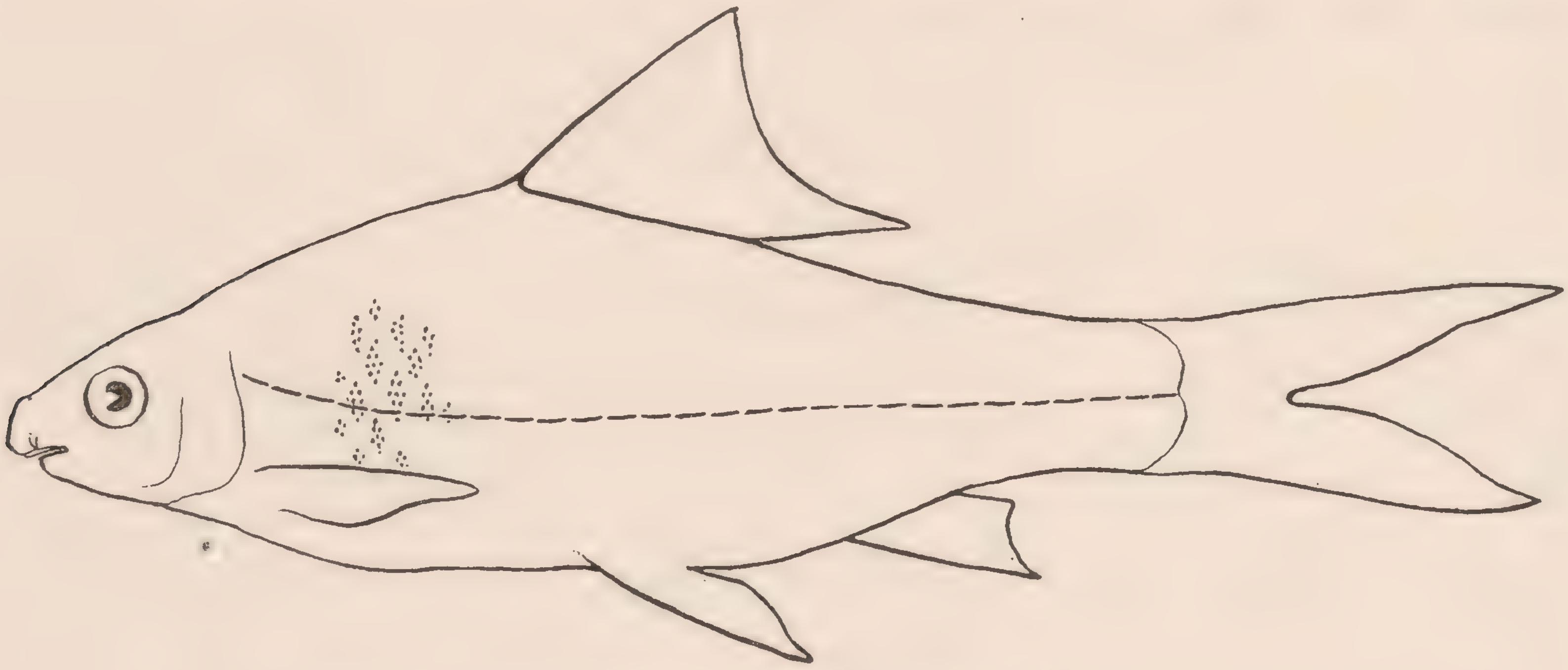

Fig. 28. *Labeo collaris*, type. 202 mm. without caudal.

Dorsal 14; anal 7½. Scales 39. Pharyngeal bone peculiar, pierced by foramina; teeth 10 in all, crowded into a double row, loosely attached, some of them compressed, broad, truncate.

Compressed; the head short broad and blunt; breast and belly rounded; vent immediately before anal origin. Mouth inferior, transverse, slightly curved, about halfway between end of snout and front of eye; upper lip slightly fluted, overhung by snout membrance; lower lip narrow, slightly papillose, free behind, separated by a slight crease in front from the narrow, curved, only slightly leathery, uncolored edge of the jaw; a pair of small barbels on the snout before the mouth, none at the corner of the mouth; maxillary not nearly reaching to under front of eye; interorbital slightly convex; eye strictly lateral; gill-membranes broadly joined to isthmus under edge of preopercle; a number of small horny warts on the tip of snout. Dorsal without spinous rays; its origin equidistant from the end of snout and anal axil; ventrals placed under middle of dorsal; pectoral reaching ⅝ the distance to ventral; ventral ¾ to anal; caudal deeply forked with pointed lobes, the upper the longer. Scales with close-spaced subparallel slightly radiating striæ; lateral line complete straight in the center, rising very slightly in front; a triangular plate above the base of the pectoral and long pointed ventral axillary flat.

Small blackish bars at the bases of many of the scales, these larger and more distinct in a vertical band over the middle of pectoral. A whitish patch under the eye.

Named from the peculiar cross-mark above the pectoral which appears to be characteristic.

XENOCYPRIS Günther

GÜNTHER, 1868, 'Cat.,' VII, p. 205. Type: *Xenocypris argentea* Günther.

Like *Varicorhinus;* dorsal with an initial strong smooth spine; no barbels; vent immediately before anal origin. Teeth 3-rowed, 6 or 7, 3 or 4, 2.

Xenocypris insularis, new species

DESCRIPTION OF TYPE.—Number 8374, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 213 mm. Depth in length 3.7; head 4.9. Eye in head 4; snout 3.2; interorbital 2.8; maxillary 4.5; width of mouth 4.6; greatest width of body 1.8; depth of peduncle 1.9; its length 1.8; pectoral 1.3; ventral 1.4; longest dorsal ray 0.9; longest anal ray 1.9; upper caudal lobe 0.7.

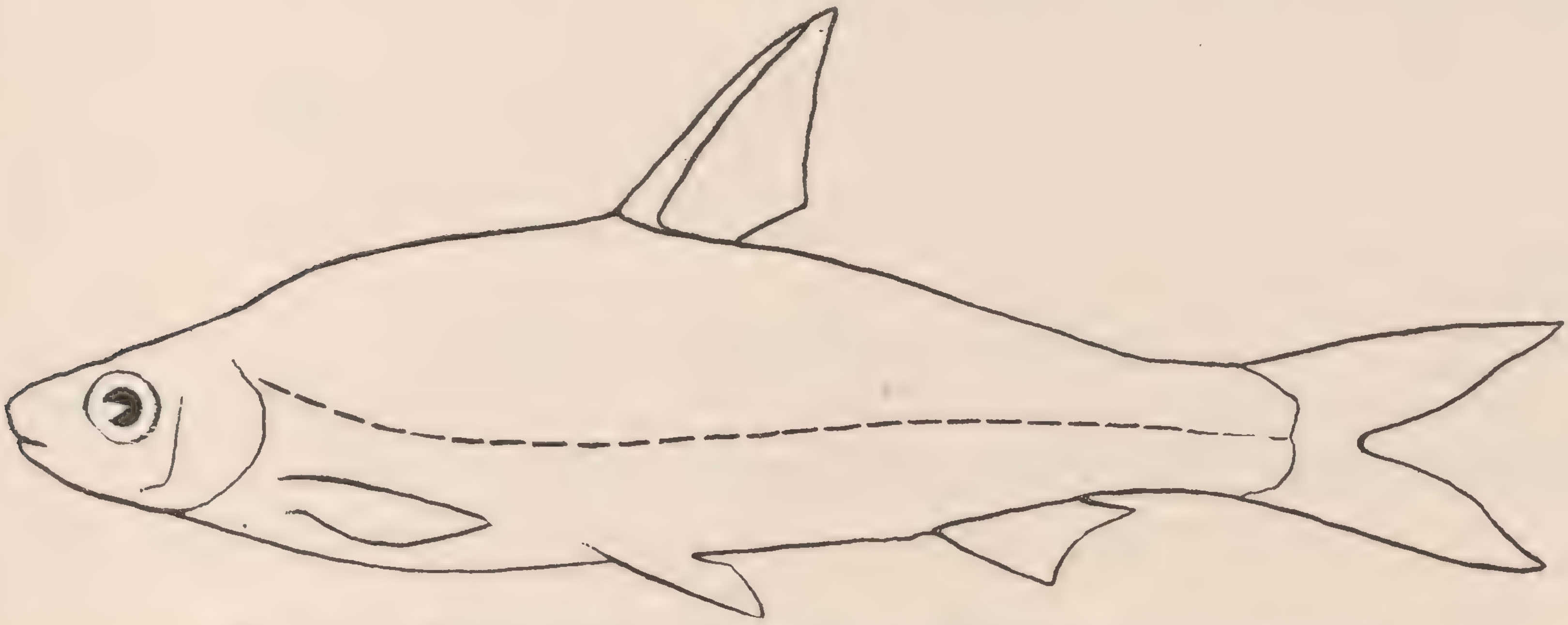

Fig. 29. *Xenocypris insularis*, type. 213 mm. without caudal.

Dorsal II, 7; anal 13. Scales 63.

Compressed; a division between the scales in the center on the posterior part of the belly as though for a low rudimentary keel. Mouth small, inferior, slightly curved, transverse; maxillary not nearly to front of eye; no barbels; interorbital convex; gill-membranes joined to isthmus under edge of preopercle. Dorsal origin equidistant from tip of snout and base of caudal or slightly nearer the former, dorsal with a long strong spine almost reaching tip of fin; ventral origin under that of dorsal; pectoral reaching 3/5 the distance to ventral; ventral about 1/2 to anal; caudal strongly forked with pointed lobes, the upper a little the longer. Scales with rather close set conspicuous moderately radiating striæ; lateral line complete, a little bent down, in the center of peduncle; a large triangular bluntly pointed scapular plate over base of pectoral.

Darkish above; lower sides, cheeks and most of opercle pale; fins plain.

This is very likely what Oshima (1926) has identified with the widely distributed *X. davidi* Bleeker, to which it is close.

Rasborinæ

When the various series of whiskered Cyprininæ, bottom-living Gobioninæ, cross-mouthed Xenocypridinæ, keeled Abramidinæ, and others have been taken from the Cyprinidæ, there remains a vast number of minnow- and club-like species occurring anywhere in the range of the family; usually slender; belly keelless or rarely with a trace of a keel; dorsal short, without developed spine; barbels absent or rarely present, then small or minute; vent immediately before anal origin. Lacking a more complete knowledge of their relationships, we are inclined to place all these in the Rasborinæ, though that subfamily might better be and doubtless usually has been by authors restricted to species with more clearly traceable relationship to the genus *Rasbora*.

RASBORA Bleeker

BLEEKER, 1859, 'Conspectus Syst. Cypr.,' Nat. Tijdschr. Ned.-Ind., XX, p. 435. Type: *Cyprinus rasbora* Hamilton-Buchanan.

Mouth normal, moderately oblique, lower jaw projecting; no barbels and no keel on belly; lateral line complete, running low, below the center for most or all its course on peduncle. Small fishes of southern Asia. Teeth 4, 3, 2.

Rasbora cephalotænia (Bleeker)

Leuciscus cephalotænia BLEEKER, 1852, Nat. Tijdschr. Ned.-Ind., III, p. 97. *Resbora cephalotænia* Weber and de Beaufort, 1916, III, p. 74, fig. 25.

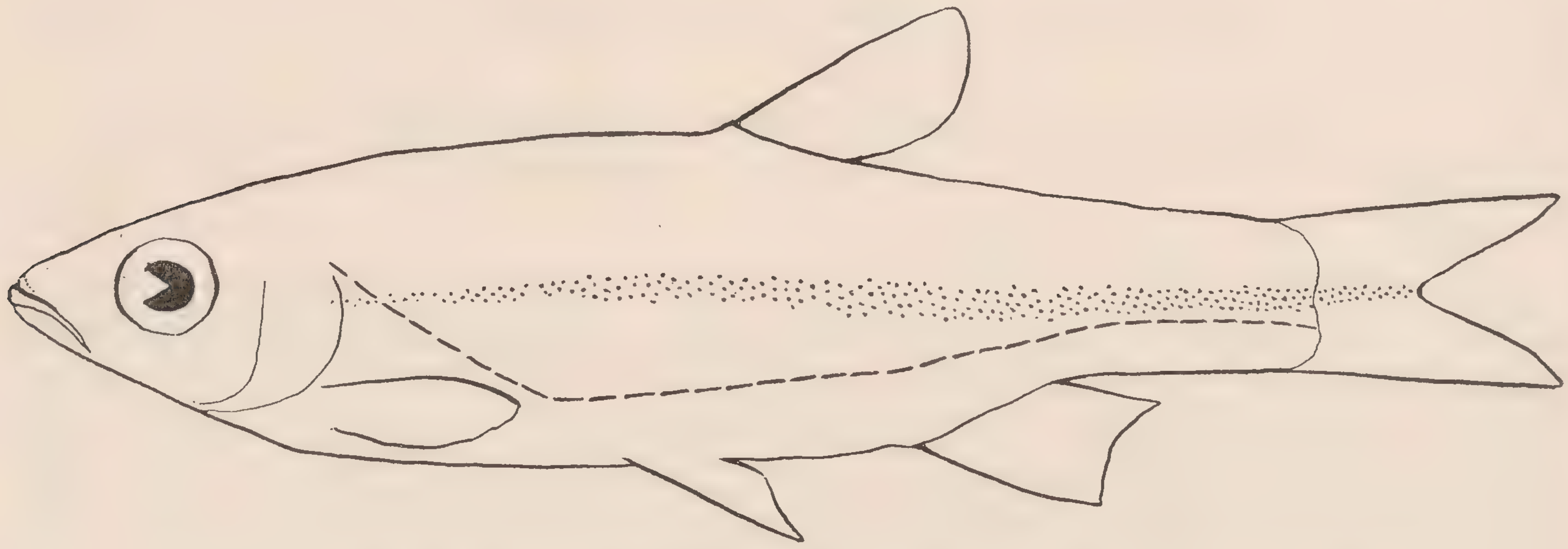

Fig. 30. *Rasbora cephalotænia steineri*, type. 65 mm. without caudal.

Rasbora cephalotænia steineri, new subspecies

Seven rows of scales between the lateral lines counted over the back of the middle of the caudal peduncle. Origin of dorsal behind the center point between snout and hindermost caudal scales; over the ventral axil. Base of dorsal in middle between ventrals and anal or slightly nearer the former. A black band on the sides. Pectoral ⅔ length of head. Scales 30; origin of dorsal opposite 12th scale; 4½ scales between lateral line and dorsal, one between lateral line and ventrals.

Description of Type.—Number 8375, American Museum of Natural History. Locality: Nodoa, Hainan, July 15, 1923. Length to base of caudal 65 mm. Depth in length 3.6; head 3.7. Eye in head 3.5; snout 3; interorbital 2.9; maxillary 3; depth of peduncle 2; length of peduncle 1; pectoral 1.5; ventral 1.6; height of dorsal 1.4; longest anal ray 1.8; caudal lobe 1.4.

Dorsal 9; anal 7. Scales 30.

Mouth moderately oblique; lower jaw projecting; end of lower jaw broad, its center and corners prominent, fitting slight emarginations in the upper; maxillary mostly concealed by preorbital. Gill-membranes free or very narrowly attached to one another or isthmus. No barbels. Last simple ray of dorsal not enlarged or spinous; ventral origin before dorsal; pectoral not reaching ventral; ventral not reaching anal; caudal forked, the lobes bluntly pointed. Scales thin and rather deciduous, striæ numerous and somewhat radiating; lateral line complete, slanting down over pectoral and running low; slanting up on peduncle, terminating at about its center.

A black stripe from opercle to caudal, continued narrowly across same; scales of sides margined with dark; belly whitish; fins grayish. A color sketch from life is olive greenish, on the sides and below silvery; fins tinged with olive, ventrals pale; a sharp black stripe from the head to the notch of the caudal fin.

Probably distinguishable as a race from East Indian *Rasbora cephalotænia*, having slightly fewer scales, greater depth and other slight differences.

Named for Rev. J. F. Steiner, of the American Presbyterian Mission of Hainan, in appreciation of his interest in the work.

Barilius Hamilton-Buchanan

Hamilton-Buchanan, 1822, 'Fishes in the Ganges,' p. 384. Type: *Cyprinus barila* Hamilton-Buchanan.

Slender, peduncle long, caudal deeply forked. Mouth terminal but the lower jaw tends to be the shorter and the snout to project. No dorsal spine. Anal rather long. Scales rather small. Fishes of southern Asia and of Africa.

Barilius hainanensis Boulenger

Barilius hainanensis Boulenger, 1899, Proc. Zoöl. Soc. London, pt. 2, p. 961, Pl. lxix, fig. 2.

This species is not found in our collection. We quote Boulenger's description:

Depth of body equal to length of head, 4⅔ times in total length. Head twice as long as broad; snout pointed, not projecting beyond the mouth, as long as diameter of eye, which is 3½ times in length of head and equals interorbital width; mouth extending hardly to below anterior border of eye; suborbitals entirely covering the cheek. Dorsal II, 7, originating just behind ventral and situated at equal distance from the eye and the root of the caudal; first branched ray ⅔ length of head. Pectoral a little shorter than head, not reaching ventral. Anal II, 14. Caudal deeply bifurcate, as long as head. Caudal peduncle nearly thrice as long as deep. Sq. 46⁶⁄₃. Silvery, darker on the back; scales above the lateral line black at the base. Total length 130 mm. A single specimen.

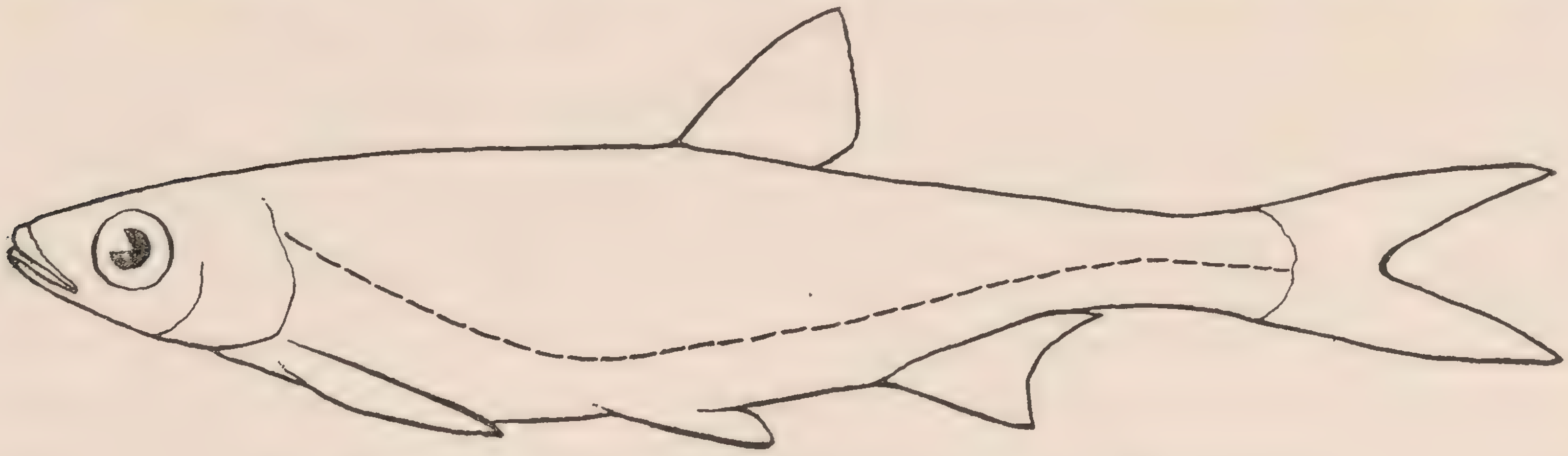

Fig. 31. *Barilius hainanensis* Boulenger after Boulenger.

ZACCO Jordan and Evermann

JORDAN AND EVERMANN, 1902, Proc. U. S. Nat. Mus., XXV, p. 322. Type: *Leuciscus platypus* Temminck and Schlegel.

Large-mouthed species related to *Rasbora* and *Opsariichthys*. Scales rather small, lateral line running low. Jaws equal or the lower projecting. The anal is rather long and in the adult its rays are widened with excerted tips. Belly more or less keeled behind ventrals. Eastern China and Japan.

Zacco asperus, new species

Opsariichthys platypus, BOULENGER, 1899, Proc. Zoöl. Soc. London, pt. 2, p. 961, not *platypus* of Temminck and Schlegel.

DESCRIPTION OF TYPE.—Number 8376, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 106 mm. Depth in length 3.5; head 3.5. Eye in head 4; snout 3; interorbital 3; maxillary 2.1; depth of peduncle 2.3; its length 1.8; longest dorsal ray 1.4; pectoral 1.3; ventral 1.6; longest anal ray 1; caudal lobe 1.

Dorsal 9; anal 14½. Scales 47; 8½ rows between lateral line and dorsal origin, 2 between lateral line and ventral.

Compressed; head pointed, its top flat; nape somewhat elevated; belly between ventrals and vent a narrow compressed ridge, across which the scales pass anteriorly but apparently not posteriorly. Mouth oblique, lower jaw projecting, with a point at the tip fitting into a notch in the tip of the upper jaw; cleft of mouth a little curved in front to suggest *Opsarichthys* slightly; maxillary narrow, not quite to under center of eye; no barbels; gill-membranes very narrowly joined to isthmus behind hind edge of eye; a close row of horny tubercles across lower preopercle; a similar row on side of mandible; a double or triple row of smaller ones across face below eye. Tubercles on head more pronounced and regular than in related species. Dorsal and anal without spinous rays; dorsal origin equidistant from front of eye and base of caudal, immediately behind axil of ventral; pectoral barely reaching ventral, ventral not to anal; anal with its central rays simple, elongate excerted; caudal forked with pointed lobes the lower a little the longer. Scales with subparallel or slightly radiating striæ; lateral line complete, much decurved, running low, rising on peduncle to gain its center several scales before the end.

Dark along the back, pale below. Scattered irregular narrow dark vertical marks on side; a vague dark central stripe at base of peduncle. Caudal and base of dorsal dark grayish.

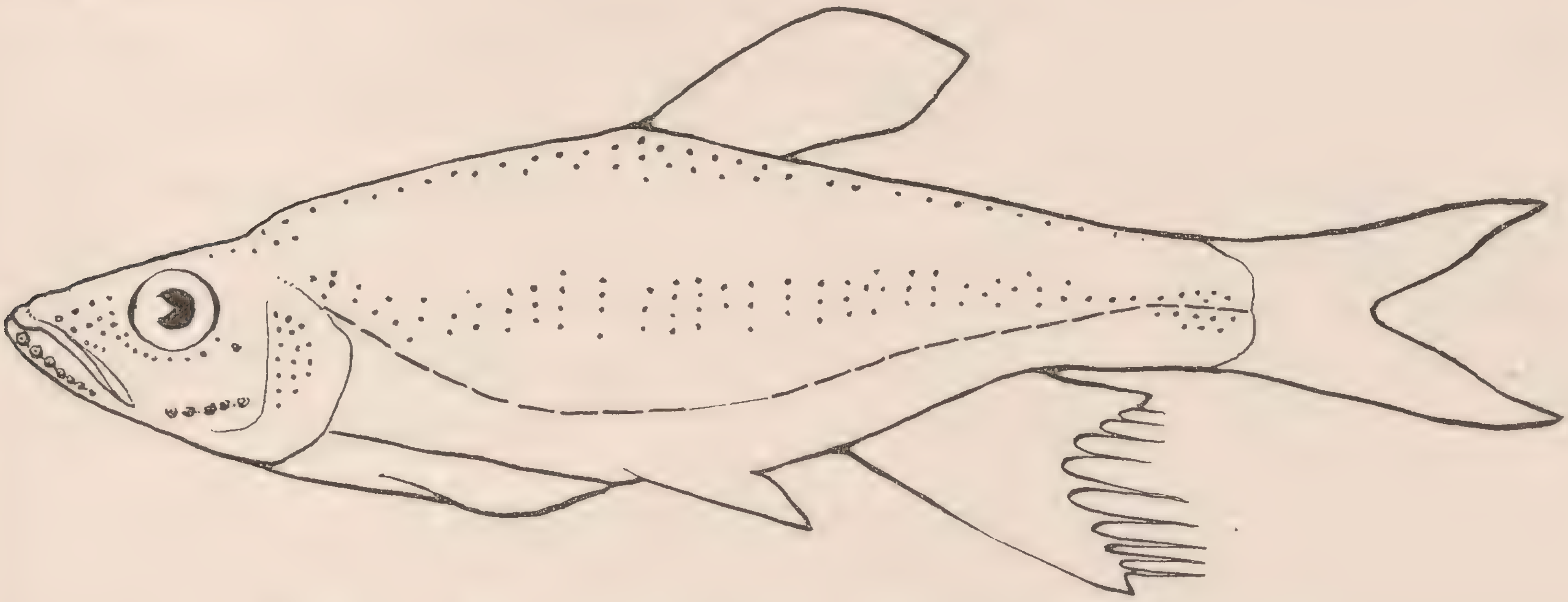

Fig. 32. *Zacco asperus*, type. 106 mm. without caudal.

Seventeen specimens (cotypes), length 85 to 110 mm., measure as follows: depth 3.9 to 3.2; head 3.3 to 3.6; eye 3.6 to 4.4; interorbital 3.5 to 2.9. Dorsal rays 9 to 10; anal 13 to 15; scales 47 to 51.

Opsariichthys Bleeker

Bleeker, 1863, Neder. Tijdschr. Dierk., I, p. 203. Type: *Leuciscus uncirostris* Temminck and Schlegel.

Large-mouthed species closely related to *Zacco*. A conspicuous projection on upper jaw at side of snout, fitting into a notch in lower jaw. Scales rather small, lateral line running low, etc. A few closely related species in eastern Asia.

Opsariichthys hainanensis, new species

Description of Type.—Number 8377, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 115 mm. Depth in length 3.8; head 3.4. Eye in head 5.3; snout 2.8; interorbital 3.2; maxillary 2; depth of peduncle 3; its length 1.8; pectoral 1.5; ventral 2; longest dorsal ray 1.5; longest anal ray 1.4; lower caudal lobe 1.1.

Dorsal 9; anal 12. Scales 40; 7½ rows between lateral line and dorsal origin, 2½ between lateral line and ventral.

Body compressed; snout pointed; profile low; top of head flat. Mouth large, oblique; a projection on upper jaw at side of snout fitting into a re-entrance in lower jaw; lower jaw slightly projecting, its narrow tip received in a notch at tip of snout; maxillary to under posterior border of eye. Dorsal and anal without spinous rays; dorsal origin equidistant from tip of snout and base of caudal; ventral origin under that of dorsal; pectoral not quite reaching to that of ventral, ventral not to anal; anal falcate; caudal well forked, lower lobe the longer. Scales with radiating striæ; lateral line complete, curving downward and running low, slanting up across peduncle to end in its center.

No color markings.

Deeper and with fewer scales than *Opsariichthys bidens*.

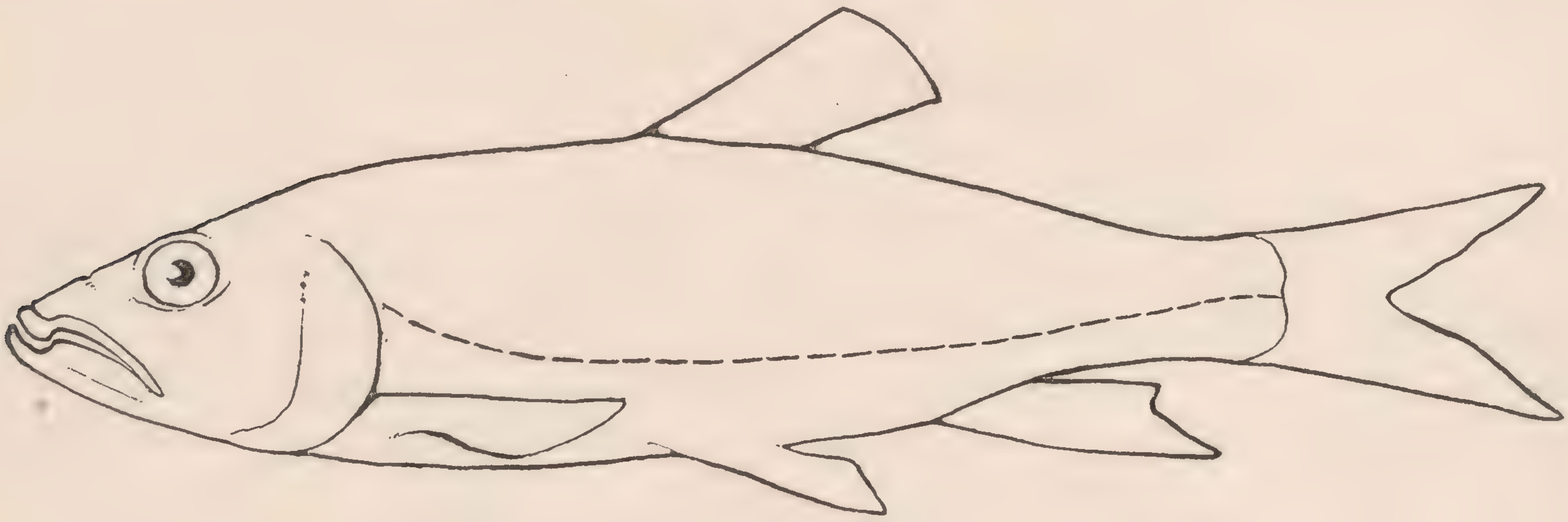

Fig. 33. *Opsariichthys hainanensis*, type. 115 mm. without caudal.

Among other Nodoa material we find a specimen (cotype) closely resembling this one, which has length 123 mm.; depth 3.5; head 3.2; eye 4.8; dorsal rays 9½; anal 11½; scales 43. There are also three specimens 97 to 105, and 128 mm. long which are probably males of the same. They have fine warts, thickly placed on the lower jaw, scattered below the eye, and a row along the lower limb of the preopercle; higher anal fin; faint dark marks on the sides, especially posteriorly, membrane between dorsal rays dusky; depth 4 to 4.1, 4.3; head 3.2 to 3.1; eye 5 to 5.5; longest anal ray 1.2, 1.4; dorsal rays 9½; anal 11, 11½; scales 42 to 43, 44. The largest of these three however looks quite different, and it may be that two or even three closely related forms are involved. It has a stouter head, less compressed more slender body, and hook in the jaws most pronounced; its lower jaw is slightly projecting as in the type and cotype, whereas in the two other specimens with warts, the jaws are even

Abramidinæ

The primary, conspicuous character in this sub-family is a keel on the belly between the ventral and anal fins. Barbels are lacking; vent immediately before anal origin. A well-developed dorsal spine may be present or absent and when present is almost invariably smooth. The anal is usually rather long. They are free-swimming fishes, frequently deep-bodied, sometimes slender. Good generic characters are to be found in extension of the keel onto the breast before the ventrals, presence or absence of dorsal spine, projecting or included lower jaw, course of the lateral line. We include here all species with keeled belly, except for one or two with obvious affinities elsewhere, and call to mind no species without a keel entitled to be considered an Abramidin. This treatment will include in the Abramidinæ one or two aberrant genera like *Hypophthalmichthys*, the true position of which is uncertain.

MEGALOBRAMA Dybowski

DYBOWSKI, 1872, Verh. Zool. Bot. Gesell. Wien, XXII, p. 212. Type: *Megalobrama skolkovii* = *Chanodichthys terminalis.*

Deep- or moderately deep-bodied; dorsal with an initial spine; jaws approximately equal; lateral line slightly and evenly decurved; keel confined to the belly behind ventrals. A few species of eastern Asia not very closely related one to the other, nor very different from *Erythroculter* and *Hemiculter.*

Megalobrama melrosei, new species

DESCRIPTION OF TYPE.—Number 8378, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 66 mm. Depth in length 3.1; head 3.8. Eye in head 2.7; snout 3.8; interorbital 3.8; maxillary 3.4; depth of peduncle 2.5; its length 1.9; pectoral 1.3; ventral 1.5; longest dorsal ray 1; longest anal ray 2.2; lower caudal lobe 0.8.

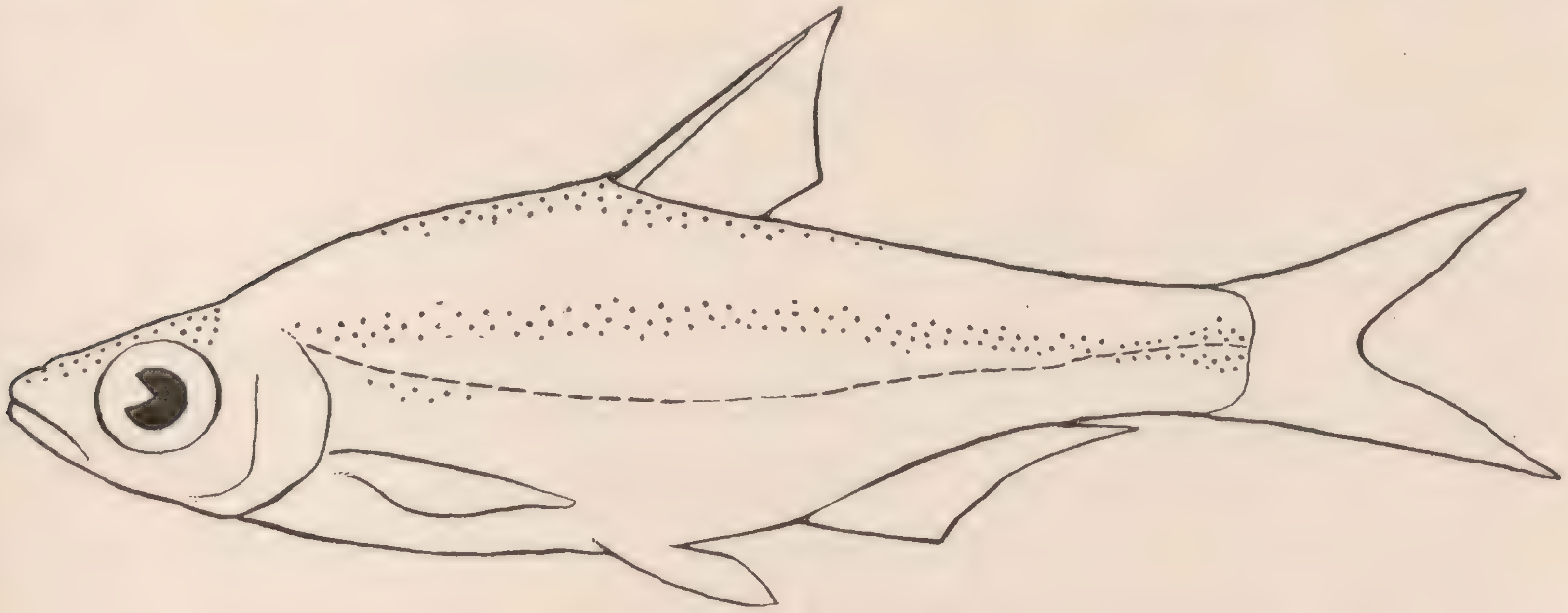

Fig. 34. *Megalobrama melrosei*, type. 66 mm. without caudal.

Dorsal II, 7; anal 23. Scales 54. Teeth 3-rowed 5, 4, 2, slightly hooked.

Compressed; breast broad and rounded; a low keel between ventrals and anal, which keel is scaled to its margin; top of head flattish; back somewhat elevated. Interorbital very slightly convex; jaws equal, the upper protractile; maxillary concealed, to under front margin of eye; no barbels; eye with a free rim; gill-membranes broadly joined to one another and to isthmus under back of eye. Dorsal with a strong slender spine, which however has a filamentous tip; dorsal origin equidistant from tip of snout and base of caudal; over ventral axil; pectoral almost or quite reaching ventral origin; ventral not quite to anal; caudal well forked with narrow pointed lobes, the lower slightly the longer. Scales with a few faint radiating striæ; lateral line complete, gently bent down, in the center of most of the peduncle.

Pale; top of head and crest of back dark; a plumbeous stripe from shoulder to base of caudal above lateral line; 2 or 3 lines of small spots following rows of scales paralleling anterior part of lateral line.

This species is very close to *Megalobrama macrops* (Günther) from Formosa, which apparently also is found in Fukien. Obvious slight differences which it shows are jaws equal versus lower slightly included; a ray or two less in the anal; a few less scales in the lateral line.

Named for Mrs. J. C. Melrose, of the American Presbyterian Mission of Hainan, in appreciation of her interest in the work.

This is very likely what Oshima (1926) identifies with *Chanodicthys affinis* Vaillant from Indo-China.

PARABRAMIS Bleeker

BLEEKER, 1865, Ned. Tijdschr. Dierk., II, p. 21. Type: *Abramis pekinensis* Basilewski.

A smooth bony spine in the dorsal. Keel present before as well as behind the ventrals. Lateral line comparatively little bent down. Jaws approximately equal. Anal long. Teeth in 3 rows.

Parabramis pekinensis (Basilewski)

Abramis pekinenis BASILEWSKI, 1855, N. Mem. Soc. Nat. Mosc., X, p. 238, Pl. VI, fig. 2. North China.

Chanodicthys stenzi POPTA, Oshima, 1926, Annot. Zool. Japon., XI, p. 18. Kachek River, Hainan

Chanodicthys stenzi is a synonym of *Parabramis pekinensis*. There is some doubt if Oshima (1926) has correctly identified his fish so recorded, and for which the following measurements are given.

Length 170 mm. Depth 3.55; head 4.10. Eye in head 3.34; snout 3.34; in-interorbital 2.85. Dorsal II, 7; anal 30. Scales 53.

CULTER Basilewski

BASILEWSKI, 1865, N. Mem. Soc. Nat. Mosc., X, p. 236. Type *Culter alburnus* Basilewski.

A smooth bony spine in the dorsal. Keel extending the whole length of the lower profile, from between the axils of the pectorals to the anal. Lateral line little bent down. Lower jaw projecting, the mouth subvertical. Teeth in 3 rows.

Culter brevicauda Günther

Culter brevicada GÜNTHER, 1868, Cat. VII, p. 329. Formosa.

Recorded by Oshima (1926) from the Kachek River, Hainan. One of his Hainan specimens measured as follows.

Length 211 mm. Depth in length 3.95; head 4.57. Eye in head 4.22; snout 4.22; interorbital 4.75; pectoral 1; ventral 1.26. Dorsal II, 7; anal 30. Scales 65.

ERYTHROCULTER Berg

BERG, 1909, Mem. Ac. Sc. St. Petersb., (8) XXIV, p. 138. Type: *Culter erythropterus* Basilewski.

Slender or moderately deep; the mouth oblique and lower jaw projecting; dorsal with a well-developed spine in front; belly with a keel behind ventrals only; lateral line little decurved; anal rather long, scales rather small.

Berg identifies *Culter alburnus*, the type of *Culter*, with a species wherein the keel extends forward of the ventrals, and proposes *Erythroculter* as a subgenus for those wherein it is confined to the region behind these fins. *Culter brevicauda*, one of the former category which we have examined, is generically distinct from those of the later category. Whereas we suspect that Basilewski's *alburnus* was actually a species with posterior keel only, quite likely identical with his *erythropterus*, one opinion is as good as another as to this and we follow Berg's ruling. Incidentally, the Hainan fish approaches *Culter brevicauda* more closely than any other *Erythroculter* known to us.

Erythroculter pseudobrevicauda, new species

DESCRIPTION OF TYPE.—Number 8400, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 170 mm. Depth in length 3.9; head 4. Eye in head 3.3; snout 3.8; interorbital 5; maxillary 3; greatest width (the back of head) 2.5; depth of peduncle 2.5; its length 1.5; dorsal spine 1.2; longest dorsal ray 1.2; longest anal ray 2; pectoral 1.4; ventral 1.5; lower caudal lobe 1.

Dorsal II, 7; anal 26. Scales 75; before dorsal 56.

Slender, compressed, breast rounded; belly behind ventrals sharply keeled; vent immediately before anal origin. Top of head flattish rising to tip of maxillary; nape elevated; interorbital narrow, a little convex; lower jaw strongly projecting; mouth strongly oblique; maxillary not quite to front of eye; no barbels; gill-membranes narrowly joined under center of eye, free from isthmus; opercle with a well-developed membranous edge. Dorsal with a strong sharp spine; its origin equidistant from end of snout and base of caudal, behind ventral axil; pectoral not quite reaching ventral, ventral ¾ to anal; caudal deeply forked, its lower lobe decidedly the longer. Scales with conspicuous radiating striæ, those on front of back very small; lateral line complete, almost straight in the center, rising slightly in front.

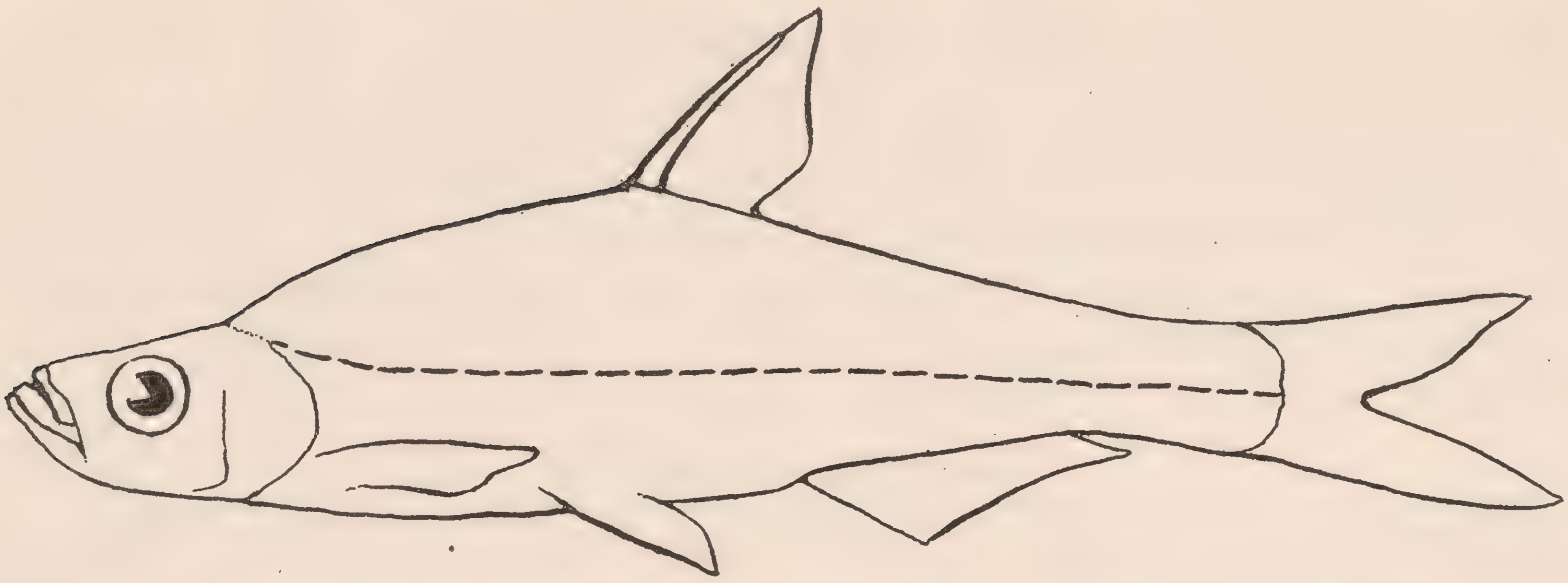

Fig. 35. *Erythroculter pseudobrevicauda*, type. 170 mm. without caudal.

Pale, darker on top of mandible, top of snout and along back; caudal with narrow dusky tips and edge within the fork.

Close to *Erythroculter aokii* (Oshima) from Formosa, differing in straighter lateral line with fewer scales, etc.

HEMICULTER Bleeker

BLEEKER, 1859, 'Conspectus Syst. Cypr.,' Nat. Tijdschr. Ned.-Ind., XX, p. 432. Type: *Culter leucisculus* Basilewski.

Slender; an initial dorsal spine; jaws about equal; lateral line running low with three abrupt turns, slanting down over pectoral, thence horizontal to about anal axil, thence slanting up to center of peduncle; teeth 3-rowed, 5, 4, 1 or 2. The abdominal keel may extend forward on breast (subgenus *Hemiculter*)[1] or stop at the ventrals (subgenus *Pseudohemiculter* new; type *Hemiculter hainanensis*).

Hemiculter hainanensis, new species

DESCRIPTION OF TYPE.—Number 8379, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 115 mm. Depth in length 3.7; head 3.5. Eye in head 3.8; snout 3.4; interorbital 3.8; maxillary 3; depth of peduncle 2.8; its length 2; pectoral 1.2; ventral 1.7; longest dorsal ray 1.4; longest anal ray 2.4; lower caudal lobe 1.

Dorsal II, 7; anal 17. Scales 56. Teeth 3-rowed, 5, 4, 2, mostly slightly hooked

Compressed; profile almost horizontal; breast broad and rounded; belly behind ventrals with a low keel which scales do not cross; vent opening in a wide backwardly directed tube. Jaws equal; mouth oblique; tip of maxillary concealed, barely reaching to under front of eye; no barbels; upper jaw protractile; corner of the preopercle projecting slightly backward; opercle with faint downwardly radiating striæ; and a well-developed membranous edge; sides of snout with a few small poorly developed warty points; interorbital flattish; orbit with a free rim and narrow membranous lid all round; gill-membranes joined to one another and center of isthmus under posterior border of eye. Dorsal with a sharp slender spine reaching almost to its tip; dorsal origin equidistant from base of caudal and middle of snout; slightly behind ventral axil; pectoral passing ventral origin; ventral reaching ⅔ distance to anal; caudal forked with narrow pointed lobes, the lower the longer. Scales with radiating striæ; lateral line complete, slanting down abruptly over pectoral, running low to anal axil, thence rising abruptly to center of peduncle.

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[1] We follow Berg (1916, 'Poiss. Eaux. Douc. Russ.,' p. 324) in identifying *Culter leucisculus* Basilewski, the type of *Hemiculter* Bleeker, with a species wherein the abdominal keel extends forward of the ventrals. Those species wherein the keel is present only behind the ventrals are at least subgenerically distinct, but the Formosan fish to which Oshima (1919, Ann. Carn. Mus., XII, p. 253) assigns the name *Cultriculus*, is apparently close to *H. leucisculus* as understood by us. However, he makes *Hemiculter kneri* Kreyenberg the type of *Cultriculus*, and the Yang-tze fish which we identify therewith, and which is certainly not his Formosan one, may stand as a third subgenus,—less compressed, first bend in lateral line little pronounced, scales deciduous. *Hemiculter kneri* Kreyenberg and Pappenheim, 1908 is antedated by *Hemiculter kneri* Warpachowski, 1888. A more detailed study of the names involved is recommended to those who enjoy the complexities of nomenclature.

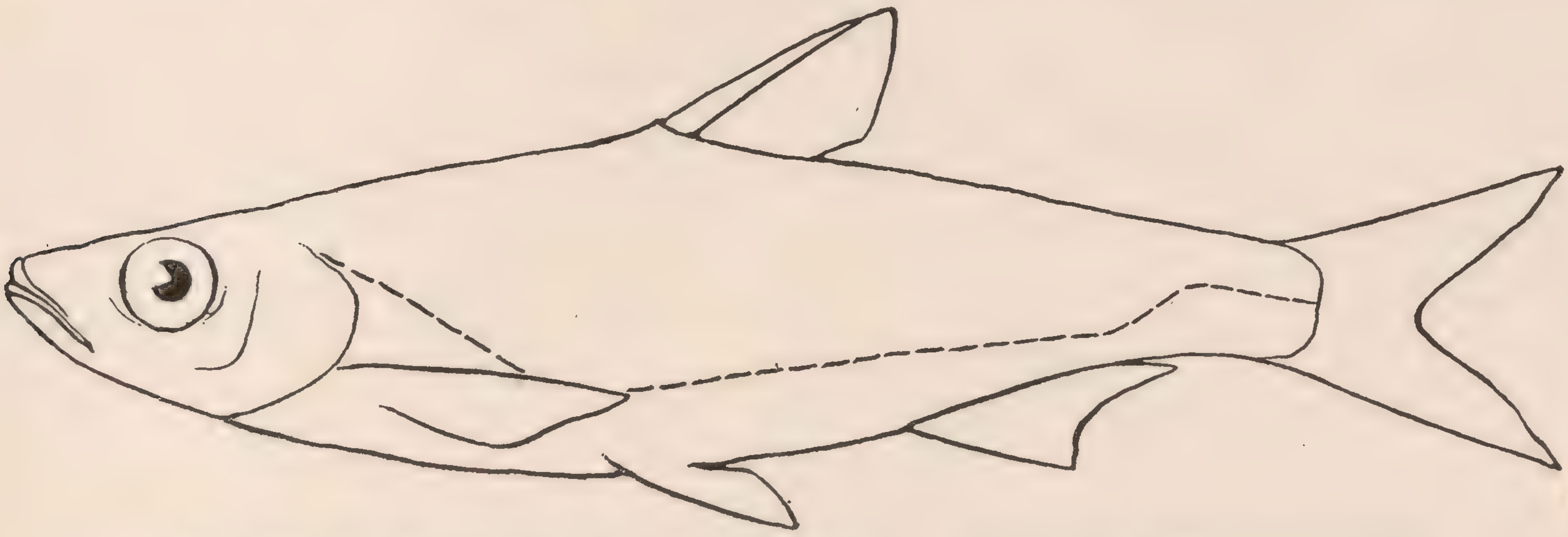

Fig. 36. *Hemiculter hainanensis*, type. 115 mm. without caudal.

Pale, a little darker along the back.

This species is apparently close to *Hemiculter dispar* Peters from Hongkong, but deeper and with smaller scales. The two should be compared and may prove identical.

Hemic ulter serracanthus, new species

A long pointed, big-eyed *Hemiculter*, with keel confined to the belly, very strong dorsal spine, finely serrate behind.

Description of Type.—Number 8380, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 113 mm. Depth in length 4.5; head 3.8. Eye in head 3.1; snout 3.3; interorbital 3.6; maxillary 3; width of body 2.8; depth of peduncle 2.9; its length 1.9; pectoral 1.2; ventral 1.8; dorsal spine 1.1; longest anal ray 2; caudal lobe 1.

Dorsal II, 7; anal 16. Scales 53. Teeth 3-rowed, 5, 4, 2, with hooked tips.

Elongate, compressed; breast rather broadly rounded; belly with a naked keel. Head narrowly pointed; orbital rim raised and center of interorbital slightly convex so that space between the eyes, as a whole, is flattish; lower jaw very slightly included; maxillary concealed, barely reaching front of eye; tip of mandible fitting into a notch in tip of upper jaw; its edges somewhat expanded to close the mouth tightly when center slips within upper jaw; sides of lower jaw with small crowded poorly developed warty points; gill-membranes narrowly joined to center of isthmus behind the back of the eye; opercle with well-developed membranous edge. Dorsal with a long strong spine which reaches approximately to tip of fin, very finely serrate on its hind edges; dorsal origin equidistant from base of caudal and middle of snout; immediately behind ventral axil; pectoral long, narrow, pointed, reaching ventral; ventral ⅔ to anal; caudal well forked with narrow pointed lobes, the lower slightly the longer. Scales with well-marked somewhat radiating striæ; lateral line complete, slanting down abruptly to over end of pectoral, running low, and rising by an abrupt slant to the center on front of peduncle.

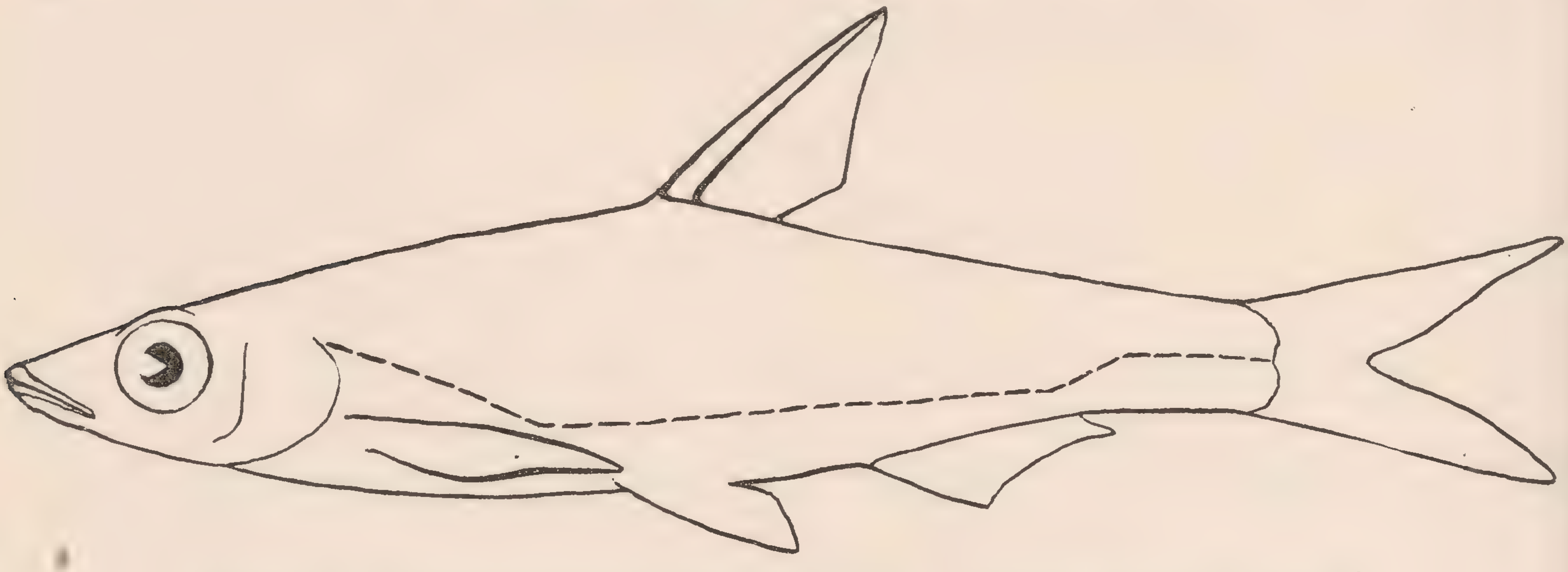

Fig. 37. *Hemiculter serracanthus*, type. 113 mm. without caudal.

Dark above, whitish below.

Ischikauia Jordan and Snyder

Jordan and Snyder, 1900, Proc. U. S. Nat. Mus., XXIII, p. 346. Type: *Opsariichthys steenackeri* Sauvage.

Body of moderate depth; dorsal without a spine; lower jaw projecting; keel not extending forward of ventrals; scales small; lateral line running low as in *Hemiculter* but less abruptly bent. Two or three species near the Pacific coast of Asia, to which the relationship of others in the interior is of doubtful closeness.

Ischikauia hainanensis, new species

Description of Type.—Number 8390, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 71 mm. Depth in length 3.6; head 3.6. Eye in head 3; snout 3.4; interorbital 3.5; maxillary 2.5; greatest width of body 2.5; depth of peduncle 2.5; its length 1.4; pectoral 1.5; ventral 1.5; longest dorsal ray 1.4; longest anal ray 1.8; caudal lobe (tip broken) about 1.1.

Dorsal 9; anal 18. Scales 50. Teeth slender, slightly hooked, 3-rowed, 5, 3 or 4, 1 or 2.

Compressed; nape somewhat elevated; top of head straight, the ends of jaws rising above its level; breast broadly rounded, belly keeled. Mouth subvertical; lower jaw projecting; maxillary to under front margin of eye; interorbital gently convex; gill-membranes narrowly joined to isthmus under hind edge of pupil; opercle with a conspicuous membranous edge. Dorsal without spinous rays, its origin equidistant from base of caudal and middle of eye, nearer anal origin than ventral axil; anal origin under posterior part of dorsal; pectoral reaching ventral, ventral not quite to anal; caudal well forked. Scales with radiating striæ; lateral line complete, slanting down steeply to over ventral, thence running low to over anal axil, thence rising to run in the center of the posterior part of peduncle, its changes of direction not very abrupt.

Pale; a plumbeous stripe in center of peduncle from under front of dorsal.

Description of a small specimen (43 mm. to b.c.), Nodoa, Hainan, February 23, 1923. Depth in length 3.6; head 3.6. Eye in head 2.7; snout 3.5; interorbital 3.5; maxillary 2.7; depth of peduncle 2.7; length of peduncle 1.4; pectoral 1.2; ventral 1.4; dorsal lobe height 1; anal lobe height 1.4; caudal lobe 0.8.

Dorsal 9; anal 9. Scales not sufficiently developed to count; about 30 rows between nape and dorsal.

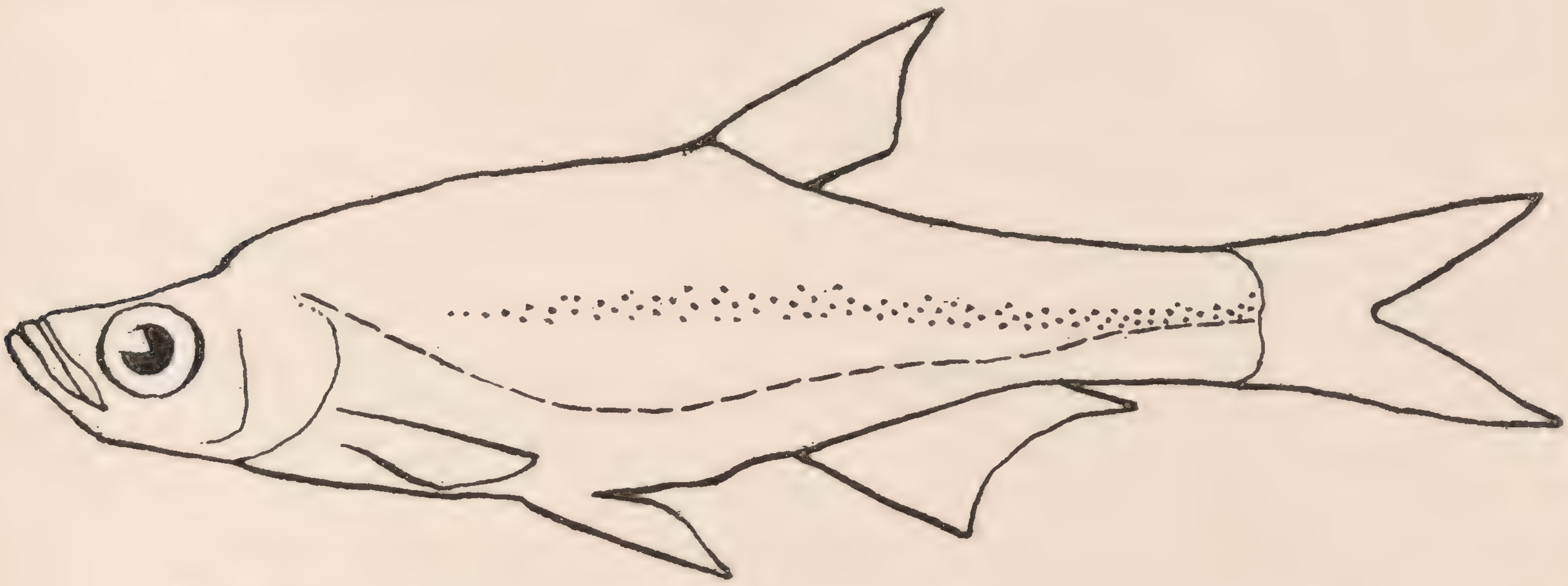

Fig. 38. *Ischikauia hainanensis*, type. 71 mm. without caudal.

Slender, compressed; the slender peduncle with a slight keel behind confluent with rudimentary precurrent rays of caudal, above and below; breast rounded; an elevated keel between ventrals and anal; profile low, slightly concave. Mandible projecting; mouth moderately oblique; maxillary mostly concealed, to or not quite to front of eye; no barbels; gill-membranes free from one another or joined at very base, free from isthmus. Simple rays in front of dorsal and anal not thickened or spinous; dorsal and anal falcate; caudal deeply forked; pectoral reaching slightly past ventral origin; ventral just to anal; dorsal origin equidistant from base of caudal and front of eye, its first ray behind ventral base, last over anal origin. Lateral line complete, slanting down steeply over pectoral, running low to near axil of anal, then slanting up to center of peduncle, and ending slightly below its center.

Pale, a little darker along back, and a dark area on nape; narrow blackish stripe from near gill-opening to base of caudal. Pale in life, body and fins translucent.

APHYOCYPRIS Günther

GÜNTHER, 1868, 'Cat. Fishes,' VII, p. 201. Type: *Aphyocypris chinensis* Günther.

Hemigrammocypris FOWLER, 1910, Proc. Acad. Nat. Sci. Phila., LXII, p. 483.

Small species with no dorsal spine and keel on the belly only; mouth oblique. Resemble *Rasborinus*, but anal short. Lateral line sometimes incomplete. Teeth 5, 3, 1; or 4, 3.

Aphyocypris normalis, new species

Plate XXVI, Figure 4

Description of Type.—Number 8381, American Museum of Natural History. Locality: Nodoa, Hainan, March 2, 1923. Length to base of caudal 64 mm. Depth in length 4; head 4. Eye in head 4; snout 4; interorbital 2.5; maxillary 2.8; depth of peduncle 2; length of peduncle 1.4; pectoral 1.2; ventral 1.7; longest dorsal ray 1.5; longest anal ray 1.7; caudal lobe 1.

Dorsal 10; anal 10½. Scales 35. Teeth 2-rowed, pointed, the tips slightly bent, 4, 3. (The teeth vary 4, 3; 4, 4, or 5, 3; 5, 4.)

Head rather broad and blunt, body compressed, interorbital flat; mouth moderately oblique; maxillary to under front of eye; jaws equal; no barbels; band of small warts on lower jaw; conspicuous pores on lower edge of preopercle. Gill-membranes narrowly joined at base, free from isthmus. Dorsal midway between ventrals and anal; pectoral just reaching ventral origin; ventrals not reaching anal; last simple ray of dorsal not enlarged or spiny; caudal forked, the lobes bluntly pointed. Lateral line complete, running low but terminating in center of peduncle; scales with radiating striæ and very fine irregular parallel markings.

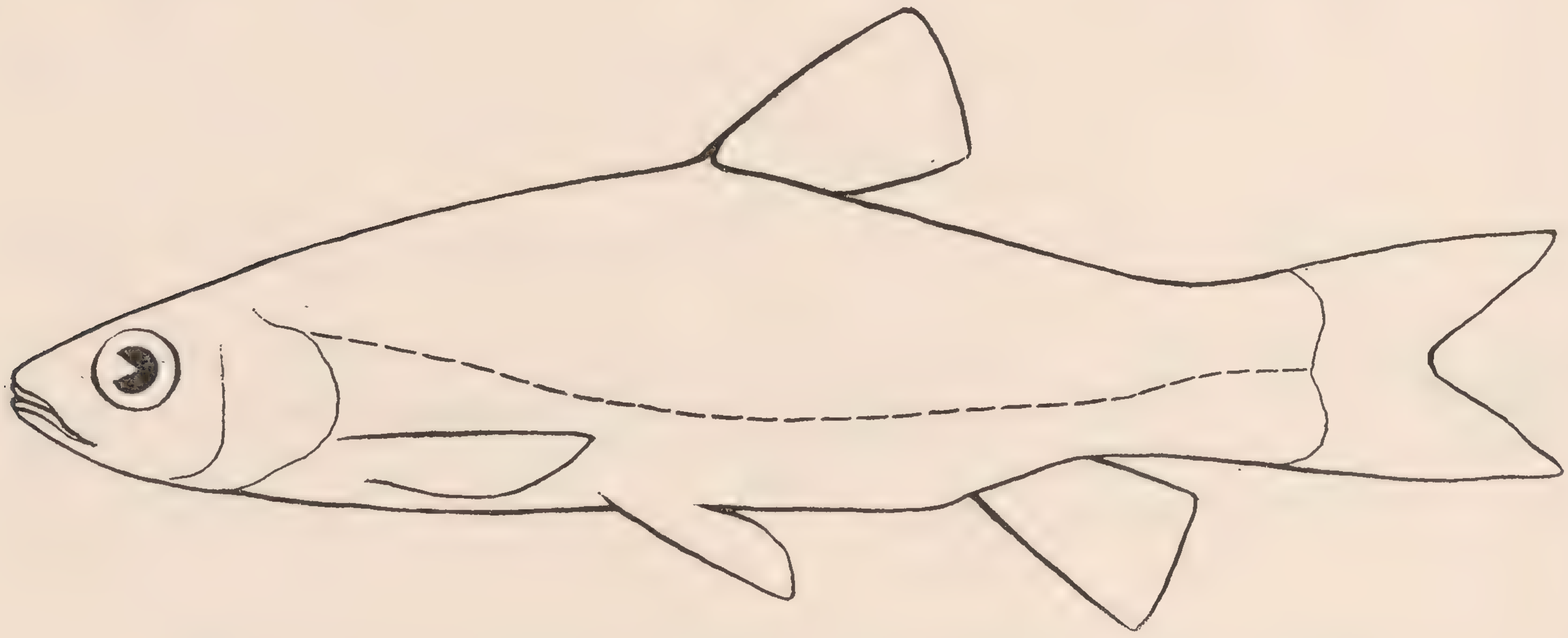

Fig. 39. *Aphyocypris normalis*, type. 64 mm. without caudal.

Scales on side with faint dark margins; no other markings. A color sketch from life is olive on the back; sides and below silvery, the scales on back and sides narrowly edged with dark; vertical fins tinged with red and paired fins pale.

Rasborinus Oshima

Oshima, 1920, Proc. Phila., LXXII, p. 130. Type: *Rasborinus takakii* Oshima; Ako, Formosa.

Body rather deep; jaws equal or the lower slightly the shorter; keel behind ventrals only; no dorsal spine; origin of dorsal behind ventral base; anal rather long. Lateral line dipping well down in a very even curve. Teeth 3-rowed. A few species in east China and adjacent islands.

Rasborinus hainanensis, new species

Description of Type.—Number 8382, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 95 mm. Depth in length 3.2; head 3.8. Eye in head 3.8; snout 4; interorbital 3.2; maxillary 3.2; depth of peduncle 2.3; its length 2.3; pectoral 1.5; ventral 1.7; longest dorsal ray 1.6; longest anal ray 2.

Dorsal 9; anal 19. Scales 41. Teeth 3-rowed, 5, 4, 2; stout, smooth, tips slightly bent.

Deep and compressed; interorbital gently convex; back somewhat elevated; a naked keel from ventrals to vent, which however is crossed by 2 or 3 scales at its front end; breast rounded. Mouth strongly oblique; somewhat curved, the lower jaw slightly included; upper jaw protractile; maxillary barely to under front of eye; no barbels; a groove across snout before nostril; gill-membranes delicately joined to isthmus under hind margin of eye. Dorsal and anal without spinous rays; dorsal origin equidistant from base of caudal and edge of preopercle; ventral origin about equidistant from tip of snout and axil of anal; pectoral blunt, not reaching ventral; ventral reaching about half-way to anal; caudal forked. Scales with radiating striæ; lateral line complete, much decurved, rising on peduncle to end near its center; a pointed ventral axillary scale, and also a narrow specialized scale under the lower axil of ventral; anal with a conspicuous basal sheath of scales.

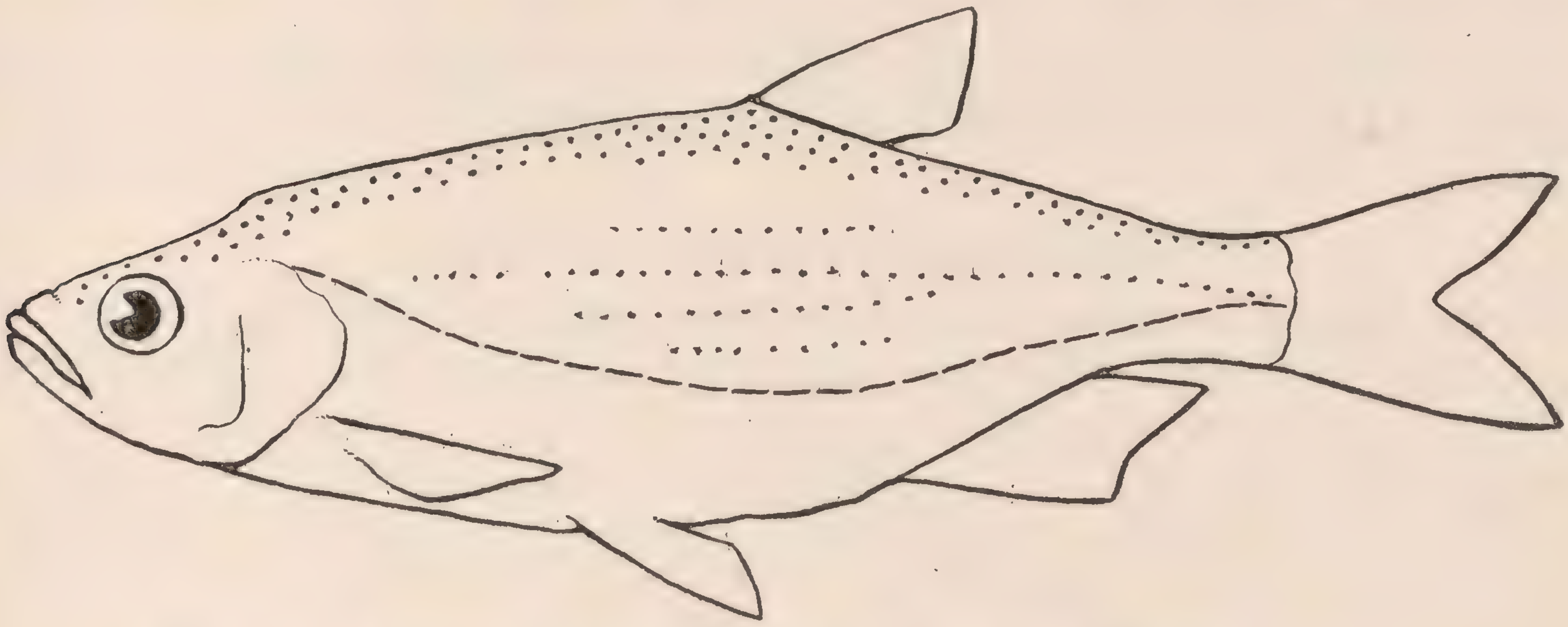

Fig. 40. *Rasborinus hainanensis*, type. 95 mm. without caudal.

Brownish; dark along back; faint narrow horizontal dark streaks following rows of scales along side above lateral line.

This is very likely what Oshima (1926) identifies with *Rasborinus takakii* Oshima from Formosa.

Rhodeinæ

Usually small, deep-bodied compressed fishes; one or more initial smooth spines variously developed or absent in the dorsal and usually in the anal to correspond, a pair of barbels present or absent; ventral bases close to the anal origin; the vent placed well forward between them, this character associated with the presence of an external ovipositor with which the female is known in some forms to place her eggs in the mantle cavity of fresh-water mussels. Mouth small, the lower jaw usually slightly included, and the snout somewhat swollen and pimply in males, overhanging the mouth. Teeth one-rowed, 5. A small closely related Eurasian group, with a widely distributed species in Europe and numerous species in the Orient.

ACANTHORHODEUS Bleeker

BLEEKER, 1870, Vers. Akad. Amsterdam, (2) XV, p. 253. Type: *Acanthorhodeus macropterus* Bleeker.

Dorsal and anal with two or three initial spines more or less developed; small barbel present or absent; lateral line complete; teeth serrate.

Acanthorhodeus tonkinensis Vaillant

Acanthorhodeus tonkinensis VAILLANT, 1892, Bull. Soc. Phil. Paris, 1891–92, p. 127. Upper Tonkin. BERG, 1907, Annals and Mag. of Nat. Hist., XIX, p. 162.

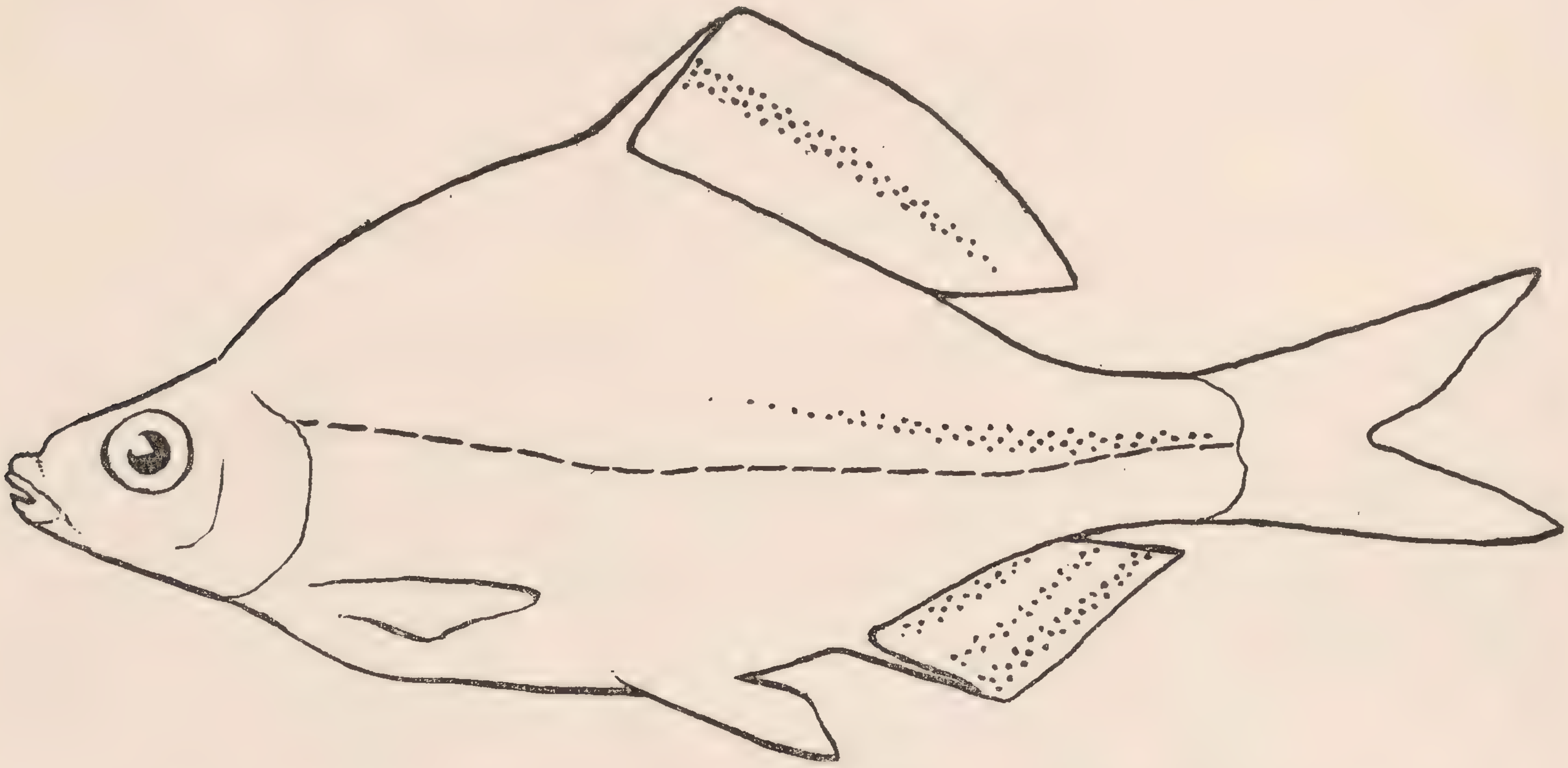

Fig. 41. *Acanthorhodeus tonkinensis* Vaillant. 77 mm. without caudal.

Head 4 in length to base or caudal; depth 2 to 2.1.

Dorsal with 13 to 15, anal with 11 to 12 soft rays; scales 36.

A minute barbel present. Teeth in one row, 5, with flat bevelled inner face one edge of which is somewhat serrate. Dorsal and anal spines well developed though with slender perfectly filamentous tips. Lateral line complete, very slightly bent down.

Two dark lengthwise stripes on dorsal and anal more or less distinct.

This seems to be the southern representative of *Acanthorhodeus guichinoti* (a common species widely distributed in central China). It is probably what Oshima (1926) has described as *Acanthorhodeus longispinus* from Kachek, Hainan.

RHODEUS Agassiz

AGASSIZ, 1835, Mem. Soc. Nat. Neuf., I, p. 37. Type: *Cyprinus amarus* Bloch.

No barbels. Lateral line incomplete. Teeth not serrate. Dorsal and anal usually rather short.

Rhodeus spinalis Oshima

Rhodeus spinalis OSHIMA, 1926, Annot. Zool. Japon., XI, p. 16, Kachek River, Hainan.

Length 78 mm. Depth in length 2; head 4.15. Snout in head 3. Eye 3; interorbital 3; pectoral 1.25; ventral 1.5; depth of peduncle, 1.88. Dorsal rays II, 10; anal II, 14. Scales 34. Black "rhodein" streak present, vertical fins dusky.

Distinguished from other members of the genus by the presence of osseous dorsal and anal spines.

PSEUDOPERILAMPUS Bleeker

BLEEKER, 1863, Neder. Tijdschr. Dierk., I, p. 214. Type: *Pseudoperilampus typus* Bleeker.

Lateral line incomplete; no spines in dorsal and anal, and no barbels; teeth one-rowed, 5, serrated. Deeper, more compressed, and smaller scaled than *Rhodeus,* with more rays in dorsal and anal.

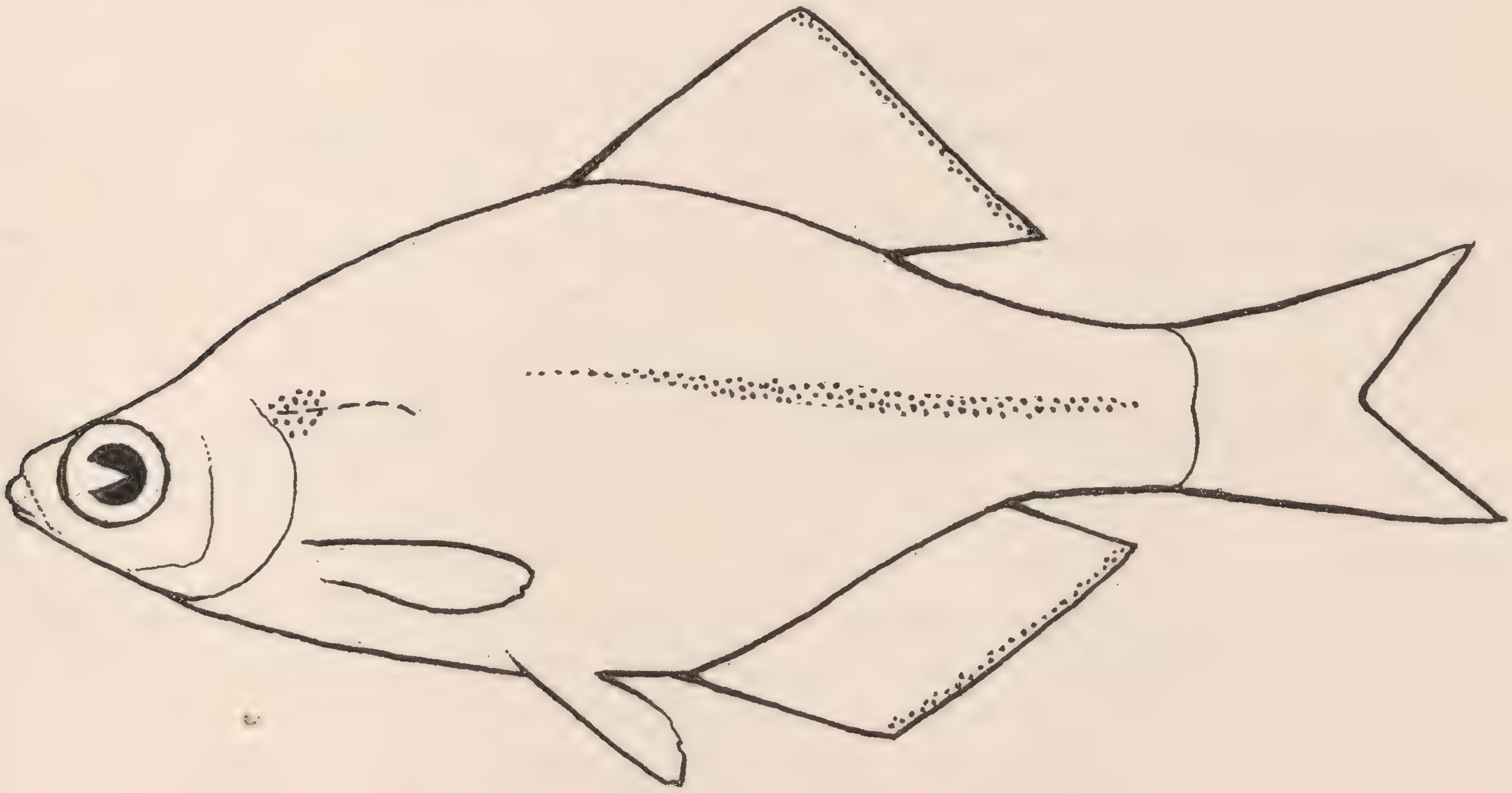

Fig. 42. *Pseudoperilampus hainanensis*, type. 39 mm. without caudal.

Pseudoperilampus hainanensis, new species

DESCRIPTION OF TYPE.—Number 8386, American Museum of Natural History. Locality: Nodoa, Hainan, February 27, 1923. Length to base of caudal 39 mm. Depth in length 2.3; head 3.9. Eye in head 2.5; snout 4; interorbital 2.4; width of mouth 4.4; depth of peduncle 1.7; length of peduncle 1.3; pectoral 1.3; ventral 1.8; longest dorsal ray 1.2; longest anal ray 1.3; caudal lobe 0.7.

Dorsal 14; anal 18. Scales 34.

Body deep and compressed; profile concave over the eye; top of head flat; breast not keeled. Mouth very small, curved, inferior; maxillary not reaching orbit; no barbels; mouth overhung by a double warty hood on tip of snout; also a line of warts passing over the large double nostril (with flap between) to the eye; gill-membranes narrowly joined to the isthmus. Ventrals approximate; the dorsal inserted over their middle; pectoral just reaching ventral; ventral just reaching anal; first two (simple) rays of dorsal and anal slender, stiffened at base soft at tip. Body covered with medium sized narrow scales which have radiating striæ; lateral line on about anterior 5 only.

A black streak in center of tail region; dorsal and anal narrowly edged with black; no other markings. A color sketch from life is dark silvery on the body tinged with purple; a narrow blue stripe in the center of the tail region; dorsal and anal tinged with purplish pink with narrow blackish margins; the dorsal also with a vague dark central band; caudal pale, its middle rays bright red.

PŒCILLIIDÆ. The Tooth-Carps

Small fishes of temporate and tropical fresh, brackish and salt water. A single small, dorsal fin without spines placed posteriorly. Mouth small, oblique transverse with small teeth, the lower jaw projecting. Few species in Asia, a moderate number in the Indian region and in Africa, the group best developed in middle America.

APLOCHEILUS McClelland

McClelland, 1839, 'Ind. Cyprin.,' p. 301. Type: *Aplocheilus melastigmus* McClelland.

Anal fin unmodified; ventrals present; teeth pointed; in a narrow band.

Aplocheilus curvinotus, new species

Premaxillaries not protractile; orbital rim adnate or with a very slight fold; teeth small, pointed, in a single irregular series or very narrow band.

Description of Type.—Number 8398, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 23 mm. Depth in length 3.4; head 3.4. Eye in head 2.6; snout 4; interorbital 2; width of mouth 2.5; width of body 1.6; depth of peduncle 2.3; its length 2.4; pectoral 1.2; ventral 2.4; longest dorsal ray 1.5; longest anal ray 1.6; caudal 1.3.

Dorsal 6; anal 25. Scales about 35.

Compressed; the head broad and wedge-shaped, flat forward, flattened above and below; belly narrow, vent immediately before anal origin. Mouth small, transverse, directed upwards; the lower jaw projecting; interorbital broad and flat; eye large, somewhat infralateral; gill-membranes narrowly joined under hind margin of eye, free from isthmus. Dorsal far back, its origin nearer caudal base than to anal origin, its tip when depressed reaching caudal base; anal long, its origin equidistant from the base of caudal and center of eye; ventrals short, extending ⅔ the distance to anal; pectoral placed high and directed somewhat upward; caudal slightly emarginate. No evident lateral line.

Top of head dark, and center of back with a dark streak. A dark streak in the center of peduncle extending forward half the length of the fish above the center of side. Viscera showing through, dark.

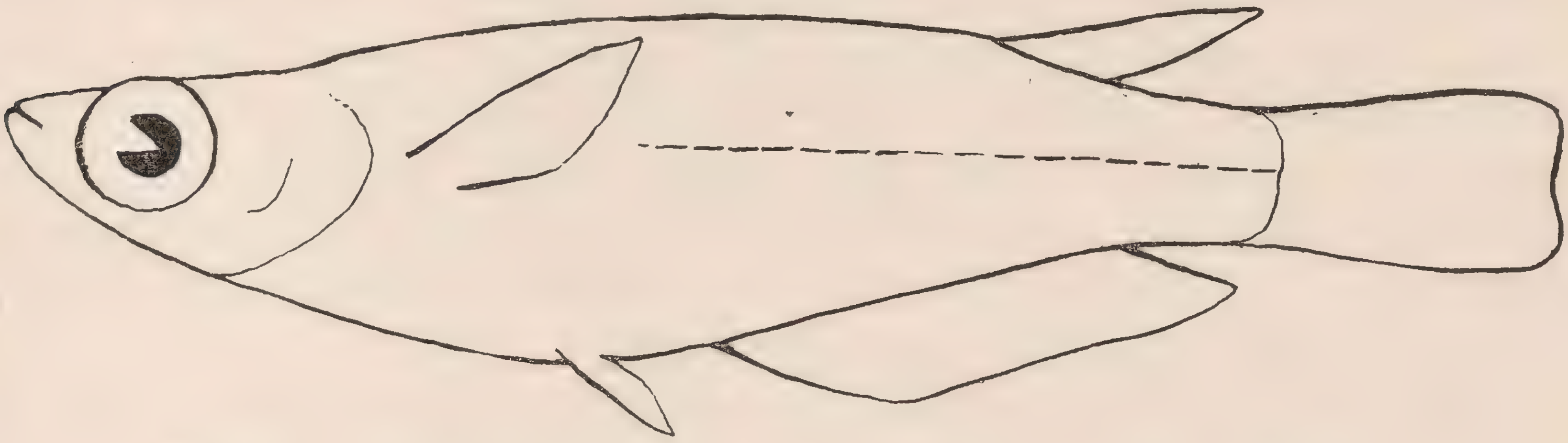

Fig. 43. *Aplocheilus curvinotus*, type. 23 mm. without caudal.

The greater number of anal rays separate this species from *A. latipes* of Japan and Formosa, type of *Oryzias* which should probably stand as a subgenus to include *curvinotus* also. In recording *Oryzias latipes* from Kachek, Hainan, Oshima (1926) probably confused *curvinotus* therewith.

AMBASSIDÆ. The Ambassids

Small, perch-like fishes, with body elevated, compressed, more or less diaphanous. Lower limb of preopercle with a double serrated edge, opercle without prominent spine. A forwardly directed recumbent spine in front of the dorsal. Spinous and soft dorsals distinct or with slight connection at the base; anal with 3 spines. Caudal well forked. Mouth oblique, the lower jaw projecting. Scales smooth, rather small, frequently deciduous.

AMBASSIS Cuvier and Valenciennes

CUVIER AND VALENCIENNES, 1828, 'Hist. Nat. Poiss.,' II, p. 175. Type: *Centropomas ambassis* Lacépède (*Ambassis commersoni* Cuvier and Valenciennes).

Ambassis gymnocephalus (Lacépède)

Lutjanus gymnocephalus LACÉPÈDE, 1802, 'Hist. Nat. Poiss.,' III, Pl. XXIII, fig. 3.

Dorsal rays VII-I, 9 to 10; anal III, 9 to 10. Scales 27 to 29. Interopercle not serrated; lateral line interrupted; two rows of scales on suborbitals.

A widely distributed coastal species from east Africa to the Malay Peninsula. Sometimes entering fresh water, and recorded from the Kachek River, Hainan by Oshima (1926).

SERRANIDÆ. The Sea Basses

Symmetrical, rather large-mouthed fishes with a spiny anterior and soft-rayed posterior portion to the dorsal fin, the two usually, not always, connected at the base. Eye moderate in position and size. Pseudobranchiæ well developed. Ventral fins without a scaly flap at their base. Upper corner of operculum with one or two more or less obscure flattened spines. The fins not densely scaled, lateral line not extending across the caudal. Ventral fins usually inserted slightly behind the pectorals, their rays regularly I, 5. Scales moderate or small, more or less rough. Teeth pointed, in bands, some of them generally hinged. Caudal rounded, squarish, or weakly forked.

Sea basses are dominent, specialized, spiny-rayed shore fishes of temperate and warm temperate seas. A few genera run into fresh water or occur exclusively in fresh water.

LATES Cuvier and Valenciennes

CUVIER AND VALENCIENNES, 1828, 'Hist. Nat. Poiss.,' II, p. 88. Type: *Perca nilotica* Linnæus.

Large fishes with spinous and soft dorsal fins separate, rough scales of moderate or small size, rounded caudal, three anal spines, large oblique mouth, eye far forward. Teeth villiform; preorbital and shoulder bone serrated; preopercle with strong spines at its angle, and denticulated along its horizontal border; opercle spiny.

Lates calcarifer (Bloch)

Holocentrus calcarifer BLOCH, 1785, 'Ichthyologie,' Pl. CCXLIV.

Depth in total length (with caudal) 3.5 to 3.7; head 3.7 to 4. Eye in head 5 to 6; snout 4; maxillary 2.4.

Dorsal rays VII to VIII–I, 10 to 12; anal III, 8 to 9. Scales 52 to 60. Dorsal spines strong, the third the highest.

Mouths of rivers in the Indian Ocean. Recorded by Oshima (1926) from the Kachek River, Hainan.

COREOPERCA Herzenstein

HERZENSTEIN, 1896, Ann. Ac. St. Petersb., p. 11. Type: *C. herzi* Herzenstein.

This genus is characterized as follows by Boulenger:

> Body compressed; scales small, cycloid, concentrically striated. Lateral line complete; tubes straight, occupying the greater length of the scale. Mouth large, protractile; maxillary exposed, with supplemental bone; villiform teeth in jaws and on vomer and palatines; no canines; tongue smooth; head partly naked; praeopercle serrated, with a few antrorse spines on the lower border; opercle with two spines. Gill-membranes separate; seven branchiostegeals; pseudobranchiæ present. Dorsal

fins confluent, XIV–XV, 11–14, the spinous portion much longer than the soft; anal short, III, 7–11; caudal rounded. Pectoral symmetrical, ventral with a strong spine and five branched rays, the last of which is connected with the belly by a membrane.

One species from North Corea and one from Hainan.

Coreoperca whiteheadi Boulenger

Coreoperca whiteheadi Boulenger, 1899, Proc. Zoöl. Soc. London, pt. 2, p. 960.

A small perch-like fish with ocellus on opercular flap.

Description based on a small specimen 68 mm. in length to base of caudal, Nodoa, April 6, 1923:

Depth in length 2.6 (to 3); head 2.3 (to 3). Eye in head 4; snout 4; interorbital 4.5; maxillary 2.4; depth of peduncle 3; pectoral 2.2; ventral 2; its spine 3.5; longest dorsal spine 3; dorsal ray 2.5; longest anal spine (2nd) 4; anal ray 2.5; caudal 1.8. Base soft dorsal in base spinous 2.

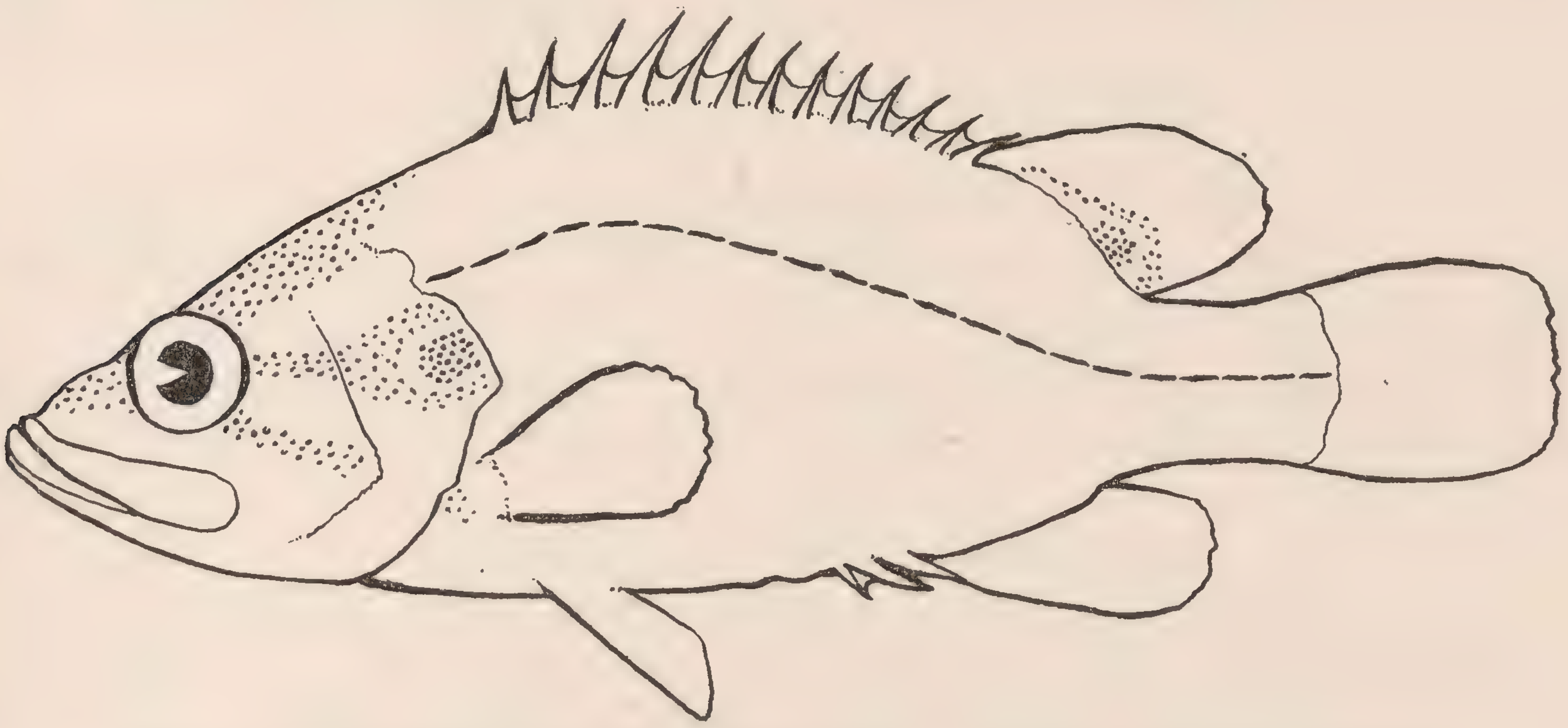

Fig. 44. *Coreoperca whiteheadi* Boulenger. 97 mm. without caudal.

Dorsal XIV, 17 (to XV, 14); anal 12 (to 11). Scales about 70 (to 80).

Snout pointed; lower jaw projecting; eye with a free rim, impinging on profile; interorbital flat or slightly concave; preopercle finely serrate, serrations a little coarser on angle and lower limb; opercle with a small sharp spine crossing a black ocellus on the flap. Gill-membranes free and independent. Dorsal and anal spines with cutaneous scaled sheaths at base, soft rays without sheath; caudal rounded subtruncate. Body covered with small cycloid scales with prominent concentric ridges; breast and cheek with smaller scales; a few scales on opercle; none on interorbital, top of snout, jaws and gill-membranes.

Color dark, with vague irregular pale mottling, breast paler. Two dark radiating stripes downward and backward from eye. Spinous dorsal dusky; ventral dusky with a broad pale edge; pectoral hyaline; soft vertical fins pale with dusky marks at the bases.

A color sketch from life is irregularly blotched, vermiculated with bluish greenish on a blackish ground; the mid-line of the head above, to include the first two dorsal spines, and the top of the peduncle light brown; two dark stripes radiating backward from the eye; a dark blue blotch with a narrow pale margin on the corner of the opercle; paired fins more or less dusky; spinous dorsal more or less black and the other vertical fins pale grayish.

This fish seemed to be rare immediately about Nodoa but common in streams of the low country some miles to the west. My fisherman knew these streams and could get the fish only by going there.

OPHIOCEPHALIDÆ. The Snake-heads

Body elongate, subcylindrical anteriorly, head more or less depressed. Mouth large. A single long spineless dorsal fin and similar though shorter anal. Body covered with small concentrically striate or embossed scales; lateral line abruptly curved or almost interrupted. Ventral fins thoracic or absent. Fresh-water fishes of southern Asia, the Indies, and 1 or 2 species in Africa.

OPHICEPHALUS Bloch

BLOCH, 1794, 'Ausländischen Fische,' VIII, p. 137. Type: *Ophicephalus punctatus* Bloch.

Ventral fins present. A number of species in southern Asia and the Indies, and 1 or 2 species in Africa.

Ophicephalus maculatus (Lacépède)

Bostrychus maculatus LACÉPÈDE, 1802, 'Hist. Nat. Poiss.,' III, pp. 140, 143.
Ophiocephalus maculatus GÜNTHER, 1861, 'Cat.,' III, p. 480.

Description of a specimen from Nodoa, July 19, 1923:

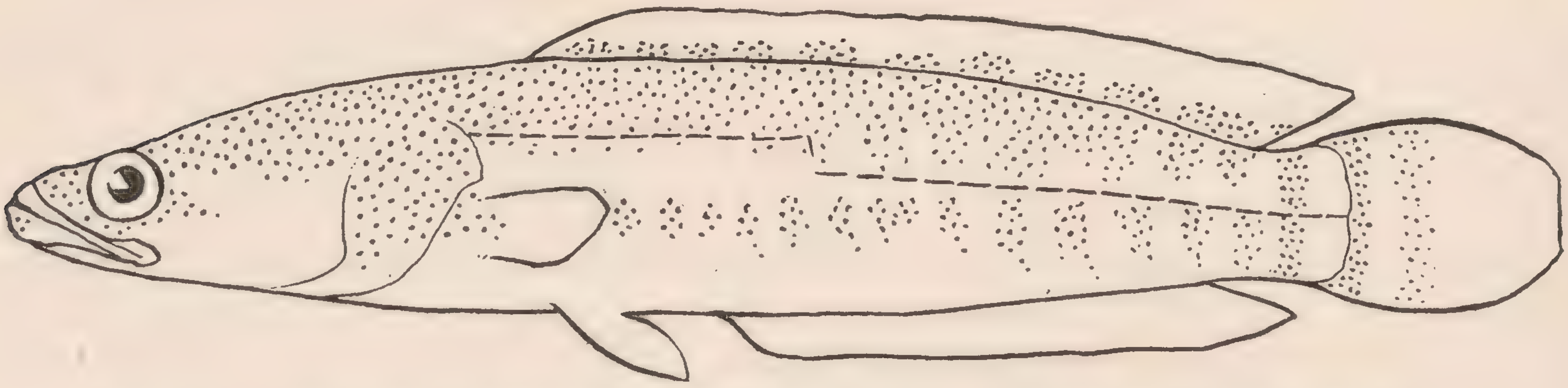

Fig. 45. *Ophicephalus maculatus* (Lacépède). 110 mm. without caudal.

Length to base of caudal 110 mm. Depth in length 5.1; Head 2.7. Eye in head 6.6; snout 4.9; interorbital 4.9; maxillary 2.6; depth of peduncle 3.4; width of body 2.3; pectoral 3.7; ventral 3.4; height (posterior) dorsal lobe 3.3; anal lobe 3.3; caudal 1.8.

Dorsal 46; anal 30. Scales 55.

Lower jaw projecting; snout and interorbital low, flat, orbital rim slightly raised; margin of eye free; maxillary extending slightly beyond eye; gill-membranes joined at base, free from isthmus. Body little compressed in front, well compressed behind.

Pectoral extending beyond ventral origin; ventral not reaching anal; dorsal inserted behind pectoral base; anal origin equidistant from base of caudal and center of eye; axil of dorsal behind that of anal. Body and head covered with small striate scales, except snout, jaws, and chin; scales extending forward on mid-line of snout above to a distance equal ⅔ of eye from tip of snout; lateral line complete; dropping 2 scale rows over front part of anal.

Base of caudal and peduncle with vague alternating pale and dark crossbands; a double row of dark marks forward on side; a dark line slanting down from back of eye; dark marks along the base of the dorsal. A color sketch from life is dark brown on the back; bluish silvery on the sides and below; a double row of closely spaced dusky blotches along the side, the upper carried forward from the angle of the gill-cleft to the eye as a dusky band, narrowing before the eye as a dusky stripe to the end of the lower jaw; irregular radiating streaks below the eye; two complete dusky bands crossing the peduncle and the base of the caudal; a reddish band between them and another behind the last; fins brownish; the paired fins tinged with orange at the base; dorsal with a series of dusky blotches on its base, and anal more or less dusky at the tip.

Ophicephalus gachua Hamilton-Buchanan

Ophiocephalus gachua Hamilton-Buchanan, 1822, 'Fishes of the Ganges,' p. 68; Weber and de Beaufort, 1922, IV, p. 321.

An *Ophiocephalus* with barred fins (in the young) and very broad head, the upper surface of which covered with rather large shields.

Description of a small specimen from Nodoa, March 9, 1923:

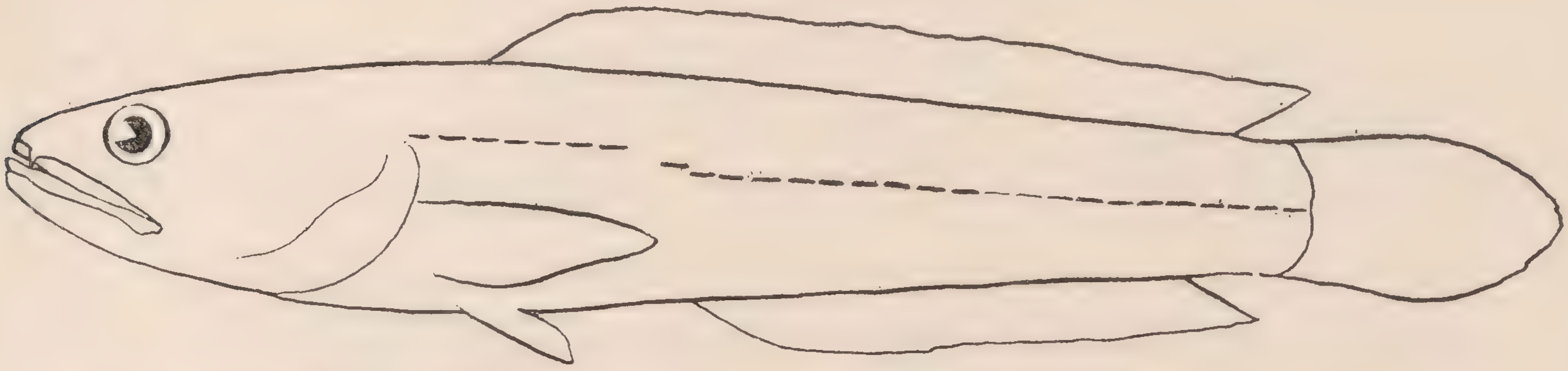

Fig. 46. *Ophicephalus gachua* Hamilton-Buchanan. 120 mm. without caudal.

Length to base of caudal 50 mm. Depth in length 5.5; head 3.2. Eye in head 5.3; snout 5.3; interorbital 3; maxillary 3; width of head 1.7; depth of peduncle 3.1; pectoral 1.5; ventral 3; height of (posterior) dorsal lobe 3; anal lobe 2.7; caudal 1.2.

Dorsal 32; anal 22. Scales 40.

Head broad, depressed; body compressed behind. Lower jaw slightly projecting; maxillary not quite to posterior edge of eye; nasal tube long; eye with a free rim; gill-membranes joined, free from isthmus. Dorsal and ventral origins apposed, a short distance behind base of pectoral; anal origin equidistant from tip of maxillary and base of caudal; dorsal axil behind anal; caudal rounded, subacuminate. Body and head covered with striate scales, absent before the eye, on tip of snout, jaws and chin; lateral line complete, dropping down a single scale row at tip of pectoral.

Brownish olive, paler along belly; sides faintly chequered; faint dark bars slanting forward and downward on back; a short bar above and a streak behind tip of maxillary; ventrals pale, other fins barred. A color sketch from life of this small specimen is brownish, more or less mottled; the body crossed by vague zigzag blackish bands; the lower side of the head varied light and dark; pectoral, dorsal, caudal and anal fins barred; eye, and a short bar near the base of the pectoral reddish.

A somewhat larger individual of 120 mm. has head 3; caudal in length 4.5 (5.5 in total); width of head 1.5 in its length, interorbital 3.5. Maxillary to under posterior edge of eye; a few teeth at side of lower jaw somewhat enlarged. Pectoral not quite to vent, more than twice length of ventral. Shields on upper surface of head rather large. Head and body dark colored; dorsal and anal dusky with a narrow whitish margin; caudal dark gray; pectoral gray with 2 or 3 narrow dark bars basally.

This species is listed from British India and Ceylon, Borneo, Java, Sumatra, Malay Peninsula, and Siam. Our two specimens agree particularly well with *Ophicephalus kelaartii* from Ceylon, synonymized with *O. gachua* by Weber and de Beaufort.

CHANNA Scopoli

Channa (Gronow, 1763, 'Zoophylaceum') SCOPOLI, 1777, 'Int. Hist. Nat.,' p. 459. Type: *Channa orientalis* Bloch and Schneider.

Ventral fins absent. A single, or two or three closely related species in southern and eastern Asia.

Channa ocellata Peters

Channa ocellata PETERS, 1864, Monatber. Acad. Wiss. Berl., p. 384. China.

Description from a small specimen (87 mm. to base of caudal) from Tungting Lake, Hunan. (Hainan material is indistinguishable):

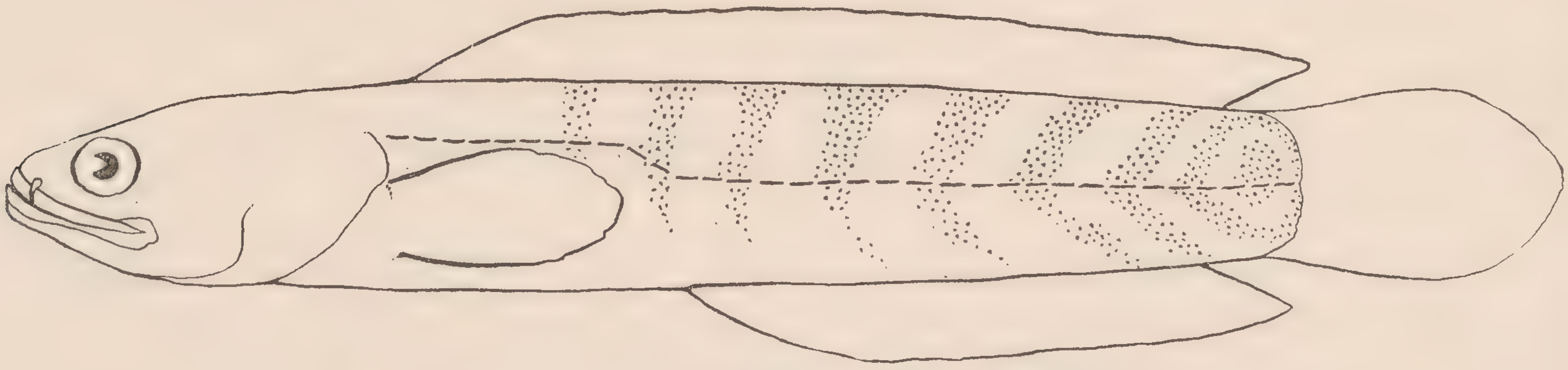

Fig. 47. *Channa ocellata* Peters. 143 mm. without caudal.

Depth in length 6.2; head 3.3. Eye in head 5.2; snout 4.8; interorbital 3.8; maxillary 2.5; depth of peduncle 2.7; pectoral 1.7; middle dorsal rays 2.8; middle anal rays 3.5; caudal 1.5.

Dorsal 46; anal 28. Scales 60.

Depressed in front, compressed behind. No ventrals. A conspicuous nasal tube on side of snout; lower jaw slightly projecting. Body and head, except snout, chin and jaws, scaled. Scales sculptured with more or less parallel concentric wavy ridges. Lateral line complete, starting high, descending gently to center of side behind tip of pectoral. Dorsal commencing behind base of pectoral. Peduncle short but evident, dorsal axil appreciably behind anal. Gill-membranes rather broadly joined, free from isthmus. Maxillary to or beyond posterior edge of eye.

Dark on top of head, pale brown on belly, sides posteriorly with V-shaped cross-bars, black ocellus at base of caudal.

A color sketch from life is as follows:—body and fins coppery olive; body crossed with irregular dark blue bands, more or less horizontal on the head behind the eye; vertical and curved on the body, to end in an oval ocellated blotch at the base of the caudal; body with points of red; head, body and dorsal with numerous scattered chalky white specks. In another sketch the bands on head and sides are black, the ocellated blotch at the caudal base dark blue bordered with orange, a blotch at the shoulder dark blue narrowly bordered with white; and the iris orange.

ANABANTIDÆ. The Labyrinth Fishes

Dorsal and anal fins of a variable number of spines and rays. Scales small or of moderate size, ctenoid; lateral line interrupted or absent. A cavity above the third or upper portion of the first branchial arch contains an elaborate apparatus consisting of thin laminæ of bone, covered by a vascular mucous membrane, and employed as an auxilliary organ of respiration. Fresh-water and estuary fishes of southern Asia and of Africa.

MACROPODUS Lacépède

LACÉPÈDE, 1802, 'Hist. Nat. Poiss.,' III, p. 416. Type: *Macropodus viridiauratus* Lacépède.

No teeth on the palate; ventral I, 5; dorsal and anal spines much more numerous than the rays. Small highly colored fishes, a few species in southern and eastern Asia and adjacent islands.

Macropodus viridiauratus Lacépède

Macropodus viridiauratus LACÉPÈDE, 1802, 'Hist. Nat. Poiss.,' III, p. 416.

Description of a specimen from Nodoa, March 14, 1923:

Length to base of caudal 36 mm. Depth in length 2.8; head 2.8. Eye in head 3.9; snout 3.9; interorbital 3; maxillary 3.9; depth of peduncle 2; pectoral 1.2; ventral 0.8; last dorsal spine 2.5; last anal spine 2.5; longest dorsal ray 1.2; longest anal ray 1.1; caudal 0.8.

Dorsal XV, 8; anal XVIII, 16. Scales 35.

Body strongly compressed. Mouth small, oblique, lower jaw slightly projecting, maxillary not nearly reaching eye. Preopercle and posterior limb of preorbital finely serrate; eye with free rim; gill-membranes joined, free from isthmus. Pectoral long, narrow fan-shaped; ventral with a filamentous ray reaching soft anal; spinous dorsal and anal long, spines increasing in length backward; lobes of shorter higher soft fins ending in filaments; axil of dorsal separated from, of anal contiguous with caudal base. Origin of dorsal and anal appreciably behind bases of paired fins, that of anal slightly the further forward. Caudal with graduated margin and forked center. Body and head covered with rough ctenoid scales, except naked preorbital; one or more broken lateral lines running high, anteriorly,—a single almost complete one posteriorly, near center of peduncle. A scaly sheath at the base of dorsal and anal.

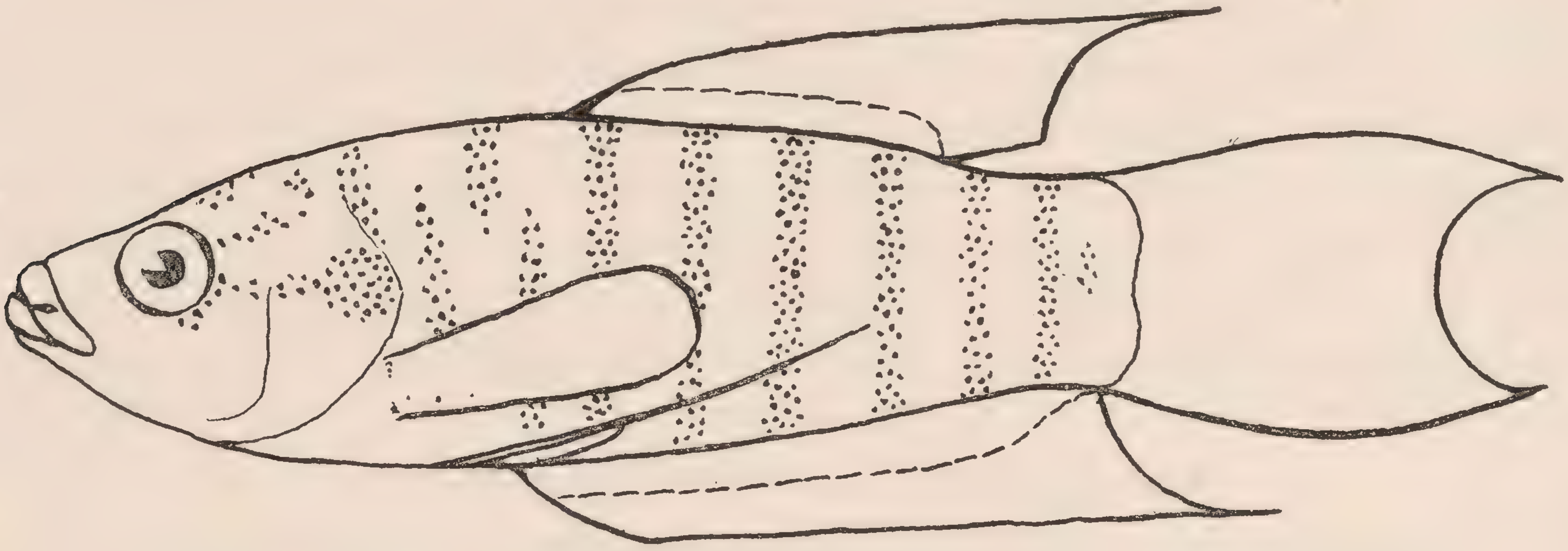

Fig. 48. *Macropodus viridiauratus* Lacépède. 36 mm. without caudal.

Two or three radiating dark lines back of eye; a black blotch on opercular angle; eight narrow vertical blackish bands on body. A color sketch from life has an olive head, red iris and blue blotch on the opercle; the body is red banded with blue; pectoral translucent; ventral filaments bright red; dorsal red at the base, bluish distally, with dark spots in the center; anal red, dusky distally; caudal red.

This fish is close to, if not identical with, material from Fukien, but quite distinct from material from Anhwei, near the mouth of the Yang-tze (*Macropodus opercularis*[1]). In recording *Polycanthus operculatus* (Linnæus) from Hainan, Oshima (1926) probably failed to differentiate *viridiauratus*.

Anabas Cuvier

Cuvier, 1817, Règne Animal,' (1st Ed.) II, p. 339. Type: *Perca scandens* Daldorff.

Teeth on the palate. Opercles and preorbital serrate.

Anabas scandens (Daldorff)

Perca scandens Daldorff, 1797, Trans. Linn. Soc. London, III, p. 62.

Depth in total length (with caudal), 3 to 4; head 3.5 to 3.7. Eye in head 4.5 to 5; equal to or greater than the snout or than ½ the interorbital. Dorsal rays XVII to XVIII, 8 to 10; anal IX to X, 9 to 11. Scales, 28 to 32. Caudal rounded.

Fresh waters and estuaries of India and the Malay region. Recorded by Oshima (1926) from Haiho, Hainan.

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[1] According to G. S. Myers [in conversation] *viridiauratus* Lacépède is a synonym of *opercularis* L., and this other form should stand as *chinensis* Bloch.

MASTACEMBELIDÆ. Spiny Eels

Compressed eel-like fishes with pointed more or less proboscis-like snout, many small sharp spines along the back, and frequently concealed spines on the side of the head. A number of species in southern Asia, the Indies, and Africa.

MASTACEMBELUS Scopoli

SCOPOLI, 1777, 'Int. Hist. Nat.,' p. 458. after Gronow. Type: *Ophidium simack* Walbaum, 1792 = *Rhynchobdella haleppensis* Bloch and Schneider, 1801 (Mastacembelus maxillis subacutis, Gronow).

Preorbital spine present.

Mastacembelus armatus, (Lacépède)

Macrognathus armatus LACÉPÈDES, 1800, 'Hist. Nat. Poiss.,' II, p. 286.
Mastacembelus armatus BOULENGER, 1912, Journ. Ac. Nat. Sci. Phila., XV.

Mastacembelus armatus undulatus (McClelland)

Macrognathus undulatus MCCLELLAND, 1844, Calcutta Journ. Nat. Hist., IV, p. 398, Pl. XXII.

Description of a specimen from Nodoa, August 2, 1923:

Length to base of caudal 160 mm. Depth in length 8.6; head 5.4. Eye in head 8; snout 3; interorbital 8; maxillary 3.6; pectoral 3.3; caudal 4; 2nd anal spine 4.5; tentacle in eye about 1; snout beyond mouth 1.5. Thickness of body 1.7 in depth.

Dorsal XXXIII, about 75; anal III, about 75 (the first spine obscure).

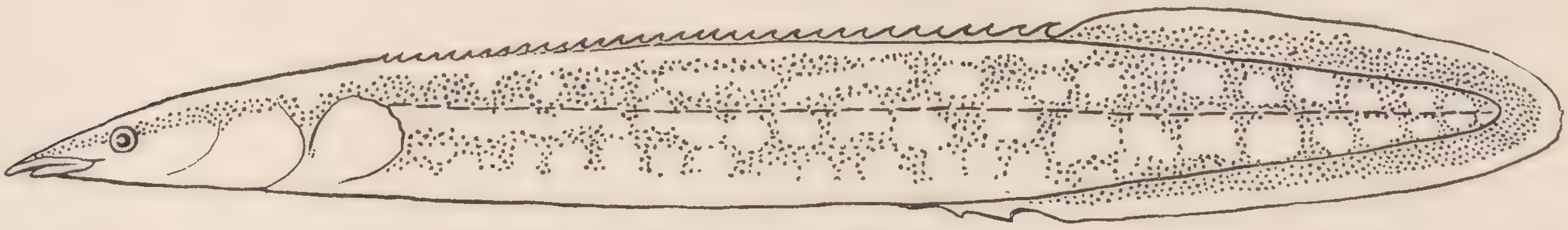


Fig. 49. *Mastacembelus armatus undulatus* (McClelland). 160 mm. without caudal.

Greatest depth of body under middle of spinous dorsal. Eye impinging slightly on profile; gill-cleft not extending above pectoral; eye without free rim; 2 preopercular spines, the upper the longer; a smaller preorbital spine. Scales very small, not evident on snout, jaws or gill-membranes, present elsewhere. Pectorals broad; dorsal spines small in front gradually increasing backward; last anal spine much the larger; first dorsal spine just behind pectoral base.

A dark band from snout through eye to dark back, and wide dark reticulations posteriorly enclosing large pale oval areas, roughly in 2 rows; fins dark, edged with whitish. A color sketch from life is pale brownish on the top of the head and on the back, including the dorsal spines; sides dark olive marked by black reticulations which are confluent anteriorly in a black band which passes forward to the eye and more narrowly from the eye to the tip of the snout; soft vertical fins around the tail black with a pale margin, this broadest, occupying most of the width of the fin, at the front of the soft dorsal; eye dull red.

This fish was common about Nodoa, though seldom taken in numbers. My fisherman was generally able to get one or two any day that he was told to do so, providing it had not rained too recently. It was only after the seventh or eighth attempt that we succeeded in keeping one alive and in good color long enough for Mr. Wang to record its form and color. A specimen would often die in less than a day after capture and its colors would change long before death.

ELEOTRIDÆ. Primitive Gobies

Small carnivorous fishes, mostly of small size, living on the bottom near shore in warm regions. Numerous in brackish as well as salt water, and some in fresh water. Body scaled; teeth weak; orbital rim adnate; dorsal fins separate, the first of a few weak flexible spines; ventral fins close together, separate, I, 5; soft dorsal and anal similar; caudal usually rounded or pointed. Opercle unarmed, preopercle frequently with a spine. Related to the true gobies (Gobiidæ) from which they differ obviously in having ventral fins separate.

PHILYPNUS Cuvier and Valenciennes

CUVIER AND VALENCIENNES, 1837, 'Hist. Nat. Poiss.,' XII, p. 255. Type: *Gobiomorus dormitator* Lacépède.

Vomer with teeth, preopercle spineless, gill openings wide, to under front part of eye. Tropical rivers.

Philypnus chalmersi, new species

DESCRIPTION OF TYPE.—Number 8384, American Museum of Natural History. Locality: Nodoa, Hainan. Length to base of caudal 102 mm. Depth in length 4.8; head 3.8. Eye in head 4.6; snout 3.3; interorbital 5; maxillary 2.4; width of head 1.8; depth of peduncle 3; its length (from dorsal axil) 1.4; longest dorsal spine 2; longest dorsal ray 1.8; pectoral 1.4; ventral 1.6; longest anal ray 2; caudal 1.3.

Dorsal VIII, 13; anal 10. Scales 42.

Little compressed deepest at nape which is slightly gibbous; vent shortly before anal origin, with a large papilla behind it. Head rather pointed, its outlines gently convex; cheeks slightly swollen; mouth oblique; maxillary to under front of eye; lower jaw projecting; eye somewhat superolateral, without free rim; gill-membranes free from one another and from isthmus. Ventrals separate. Scales finely ctenoid on sides; those on breast smaller; body completely scaled; side of head scaled, interorbital snout and jaws scaleless; lateral line almost complete.

Brownish, head darker on snout, behind eye, along margin of opercle and gill-membranes. Upper parts speckled with black, dorsals and caudal finely barred.

A SMALLER SPECIMEN.—Number 8385, American Museum of Natural History. Locality: Nodoa, Hainan, July 21, 1923. Length to base of caudal 58 mm. Depth in length 5; head 3. Eye in head 4.5; snout 3.2; interorbital 6.5; maxillary 2.7; thickness of body 2.1; depth of peduncle 3.3; pectoral 1.6; ventral 1.6; longest dorsal spine 2.5; longest dorsal ray 2.7; longest anal ray 3; caudal 1.6.

Dorsal VIII, 12; anal 10. Scales about 40, irregular. Ventral 6.

Body little compressed, back elevated; snout rather narrow, pointed; breast and belly flattened. Lower jaw projecting; maxillary passing front of eye; gill-membranes free from one another and from isthmus; 3 or 4 rows of conspicuous pores below the eye; no spines about head. Teeth small in broad bands in jaws, the inner teeth of the upper jaw slightly enlarged and notably depressible, a curved band of fine teeth on the vomer, tongue toothless. Gill rakers well developed, lanceolate, rather short and numerous, about 15 on the lower limb of the first arch. Pectoral long and narrow with a broad base; ventral origin behind pectoral base and before origin of spinous dorsal; anal origin behind that of 2nd dorsal; caudal narrow, subtruncate; bases of ventrals separated by ⅔ that of one; spines of 1st dorsal slender and soft. Body and back covered with small thin ctenoid scales, none on interorbital, snout, or jaws; lateral line somewhat obscure and broken, running straight from under pectoral and stopping a scale or two short of caudal, scales of lateral line and peduncle somewhat larger, on shoulder small and crowded.

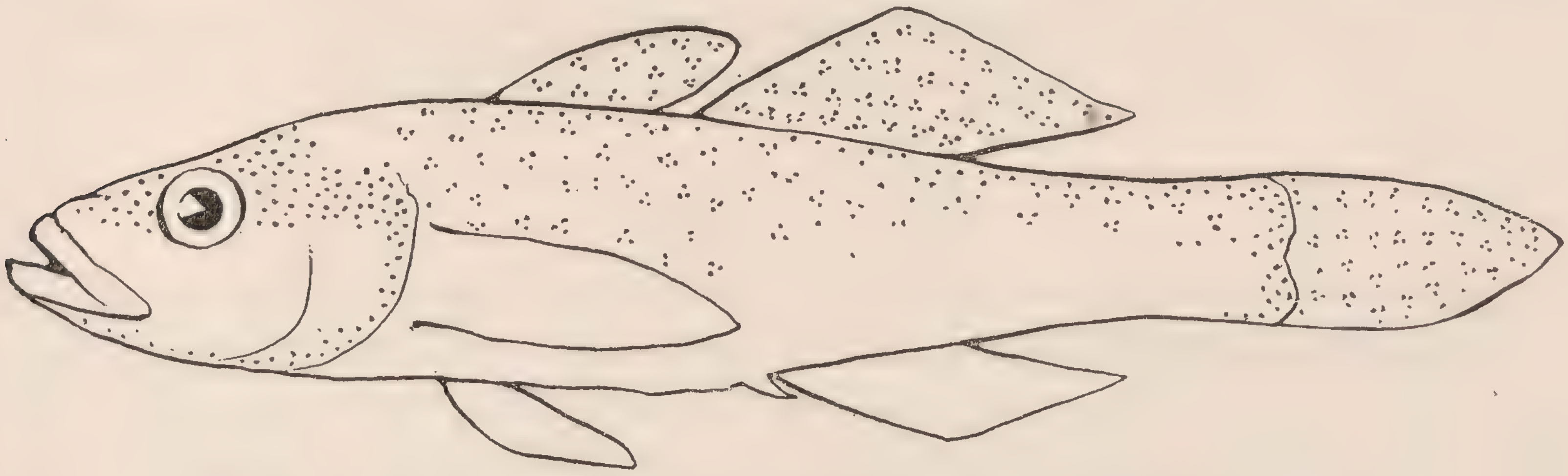


Fig. 50. *Philypnus chalmersi*, type. 102 mm. without caudal.

Dark vertical mark below eye and horizontal marks along center of side. Dark spot on upper pectoral base, and band across base of caudal; caudal barred, dorsals spotted. A color sketch from life of a small specimen is: brownish, paler below; three or four vague dark areas on the back; several dark streaks radiating from the eye, and along the centre of the side; a blue spot on the opercle; a dark bar across the base of the caudal; dorsals and caudal spotted on the rays; posterior corner of the first dorsal dusky; other fins pale.

Named for Chalmers Salsbury, son of Dr. Clarence G. Salsbury.

Eleotris Gronow

Gronow, 1763, Zoophylaceum, p. 83. Bloch and Schneider, 1801. Type: *Gobius pisonis* Gmelin.

Vomer without teeth; preopercle with a concealed spine; isthmus wide, gill openings extending no farther forward than posterior angle of preopercle.

Eleotris oxycephala, Temminck and Schlegel

Eleotris oxycephala TEMMINCK AND SCHLEGEL, 1847, 'Fauna Japonica,' p. 149, Pl. LXXVII, fig. 4 and 5. Japan.

Depth in length 6; head 4; eye in head 5.5; snout, 5; interorbital 3.7; maxillary 2.6. Lower jaw strongly projecting. Dorsal VI, 9; anal 9.

Recorded by Oshima (1926) from Haiho and the Kachek River, Hainan. The species is close to and may have been confused with *Eleotris balia* Jordan and Seale from China, probably Hongkong.

GOBIIDÆ. The Gobies

A large family of small, bottom fishes, everywhere abundant in warm seas. Allied to the more primitive Eleotridæ but with ventral fins united.

GOBIUS Linnæus

LINNÆUS, 1758, 10th Ed., I, p. 263. Type: *Gobius niger* Linnæus.

Dorsal fins separate, free from the caudal; ventral disk free from the belly; dorsal spines 6; eyes well developed; teeth simple; body with more or less ctenoid scales; interorbital area without fleshy crest and inner edge of shoulder girdle without fleshy cirri or papillæ.

A large cosmopolitan genus, mostly marine but occurring also in fresh water. Recently much divided, the divisions best recognized as subgenera.

Subgenus **RHINOGOBIUS** Gill

One or more species of small fishes representing this subgenus occur in most of the fresh waters of eastern Asia.

Gobius hadropterus (Jordan and Snyder)

Ctenogobius hadropterus JORDAN AND SNYDER, 1902, Proc. U. S. Nat. Mus., XXIV, p. 60. Japan.

We have several small specimens from Nodoa, mostly under 35 mm. in length to base of caudal, provisionally identified with this Japanese species. They have the caudal crossed by narrow dark bars.

A larger specimen from Fukien may be described as follows:

Length to base of caudal 65 mm. Depth in length 5; head 3.2. Eye in head 5; snout 2.5; maxillary 2.1; width of head 1.6; depth of peduncle 2.6; its length 1.3; pectoral 1.3; ventral 1.6; longest dorsal spine 2.3; longest dorsal ray (last) 1.3; longest anal ray (last) 1.5; caudal 1.3. Interorbital in eye 1.5.

Dorsal VI, 9; anal 9. Scales 30.

A little depressed in front, compressed behind; lower surface of head and breast flattish, sides above them sloping to mid-dorsal line; vent situated behind a flat flap, almost immediately before anal origin. Cheeks swollen; eyes superolateral, close together; interorbital a little concave; mouth very slightly oblique; lower jaw very slightly included; maxillary to under front of pupil; lips broad. Ventral origin a little behind pectoral base, slightly before origin of dorsal; pectoral reaching almost to over anal origin, ventral not reaching quite so far back; caudal pointed; ventrals united into a disk, free behind, with a rounded tip, its anterior flap truncate in the center with pointed excerted corners. Scales more or less pointed; with comb edges and converging striæ; small and imbedded on the belly; lateral line very little developed, on the tail only. Orbital rim adnate above with a rather deep fold below; Gill-membranes broadly joined to side of breast beneath branchiostegals under edge of preopercle.

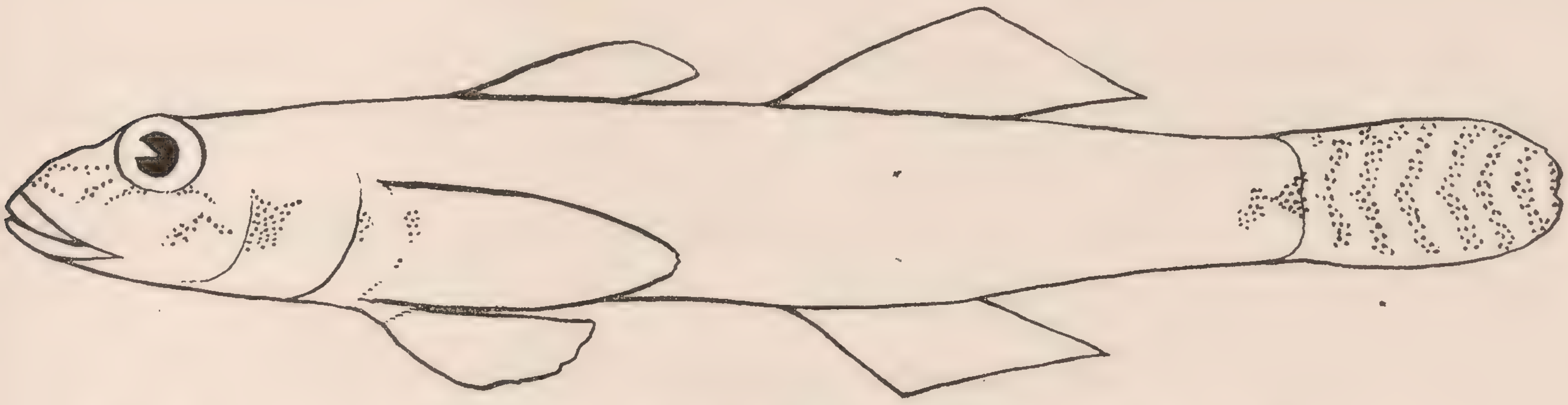


Fig. 51. *Gobius hadropterus* (Jordan and Snyder). 38 mm. without caudal.

A small dark mark at upper corner of pectoral base, and on base of the central caudal rays; snout faintly vermiculated; fins grayish, dorsal and anal lobes dusky. Several other specimens from Fukien, mostly a little smaller with pale fins.

This species has previously been listed from China by Rendahl (1924, Arkiv for Zoologi, Stockholm, XVI, p. 18).

Gobius giurinus Rutter

Gobius giurinus Rutter, 1897, Proc. Acad. Phila., XLIX, p. 86. Swatow.

Recorded by Oshima (1926) from the Kachek River, Hainan. If we are correct in identifying with this species a specimen 75 mm. in standard length from Fukien, it is close to *Gobius hadropterus*. At this size the soft dorsal and anal are less high, their longest rays contained respectively 1.7 and 1.8 in the head. The head is less deep, more pointed, the lower jaw distinctly included instead of very slightly so; peduncle more slender. Depth 5; head 3.3. Eye in head 4.5; snout 2.7; maxillary 2.4; depth of peduncle 3.4; its length 1.1. Dorsal rays, VI, 10; anal 8. Scales 32.

Gobius hainanensis (Oshima)

Rhinogobius hainanensis Oshima, 1926, Annot. Zool. Japon., XI, p. 23. Kachek River, Hainan.

Length 104 mm. Depth 4.59; head 3.90; depth of peduncle 7.8. Eye in head 4; snout 3.35; interorbital 4; maxillary 2.65. Dorsal rays VI, 11; anal 11. Scales 50. Mouth slightly oblique; jaws subequal, the lower very slightly projecting. Ventrals extending as far back as pectorals, not reaching vent. Body with uniform, conspicuous scales, those on the nape small, breast anterior to ventrals almost naked. Back maculated with black; sides with about 10 dark V-shaped cross-bands, the angle of which is directed backward. A dark triangular blotch below the eye; dark brown spot at upper part of pectoral base; dorsal banded longitudinally; anal membrane dark gray.

Subgenus **Glossogobius** Gill

Gobius brunneus Temminck and Schlegel

Gobius brunneus Temminck and Schlegel, 1847, 'Fauna Japonica,' p. 142, Pl. LXXIV, fig. 2. Japan.

Depth in total length (with caudal) about 6; head 4 plus. Eye in head 6.7; snout 3.5. Lower jaw projecting. Dorsal rays VI, 10; anal 8. Scales about 32. Color brownish, without bold markings.

This member of the subgenus (*Glossogobius*) is recorded by Oshima (1926) from Kachek River, Hainan.

Gobius grammepomus Bleeker

Gobius grammepomus Bleeker, 1849, Verh. Bat. Gen., XXII, p. 34. East Indies.

Depth in total length 5.5 to 7.5; head 4 to 4.7; caudal rounded 5 to 5.5. Eye in head 4 to 5; snout longer than eye. An oblique streak from the eye to the maxillary. Dorsal rays VI, 10; anal 10. Scales 50 to 55.

Recorded by Oshima (1926) from Kachek River, Hainan.

BIBLIOGRAPHY

The following titles in particular have been referred to in preparation of this paper:

Günther, 1864, 'Catalogue of Fishes,' V.

Günther, 1868, 'Catalogue of Fishes,' VII.

Boulenger, 1899, 'Reptiles, Batrachians and Fishes Collected by Mr. John Whitehead in Hainan,' Proc. Zoöl. Soc. London, 1899, p. 956, etc.

Berg, 1907, 'Synopsis of the Rhodeinæ,' Ann. and Mag. Nat. Hist., XIX, p. 159, etc.

Berg, 1912 and 1914, 'Faune de la Russie, Poissons,' III, pts. 1 and 2.

Weber and de Beaufort, 1916, 'Fishes of the Indo-Australian Archipelago,' III.

Berg, 1916, 'Poissons des Eaux Douces de la Russie.'

Jordan and Evermann, 1917, 'Genera of Fishes.'

Nichols, 1918, 'New Chinese Fishes,' Proc. Biol. Soc. Wash., XXIII, p. 15, etc.

Jordan, 1919, 'Genera of Fishes,' II and III.

Oshima, 1919, 'Fresh Water Fishes of Formosa,' Ann. Carn. Mus., XII, p. 169, etc.

Oshima, 1920, 'Notes on Fresh Water Fishes of Formosa,' Proc. Ac. Nat. Sci. Phila., LXXII, p. 120, etc.

Jordan, 1920, 'Genera of Fishes,' IV.

Weber and de Beaufort, 1922, 'Fishes of the Indo-Australian Archipelago,' IV.

Rendahl, 1924, 'Beaiträge zur Kenntniss marinen Ichthyologie von China,' Ark. Zool., XVI, No. 2.

Fowler, 1924, 'Some Fishes Collected by the 3rd Asiatic Expedition in China,' Bull. Amer. Mus. Nat. Hist., VI, p. 373, etc.

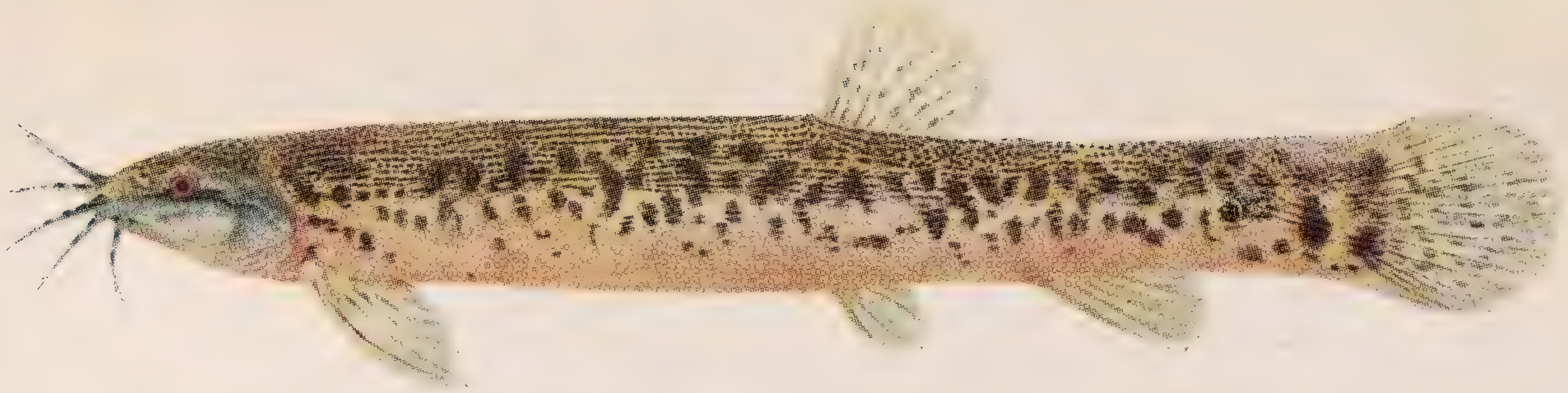
Oshima, 1926, 'On a collection of Fishes from Hainan,' Annot. Zool. Japon., XI, p. 1–25.

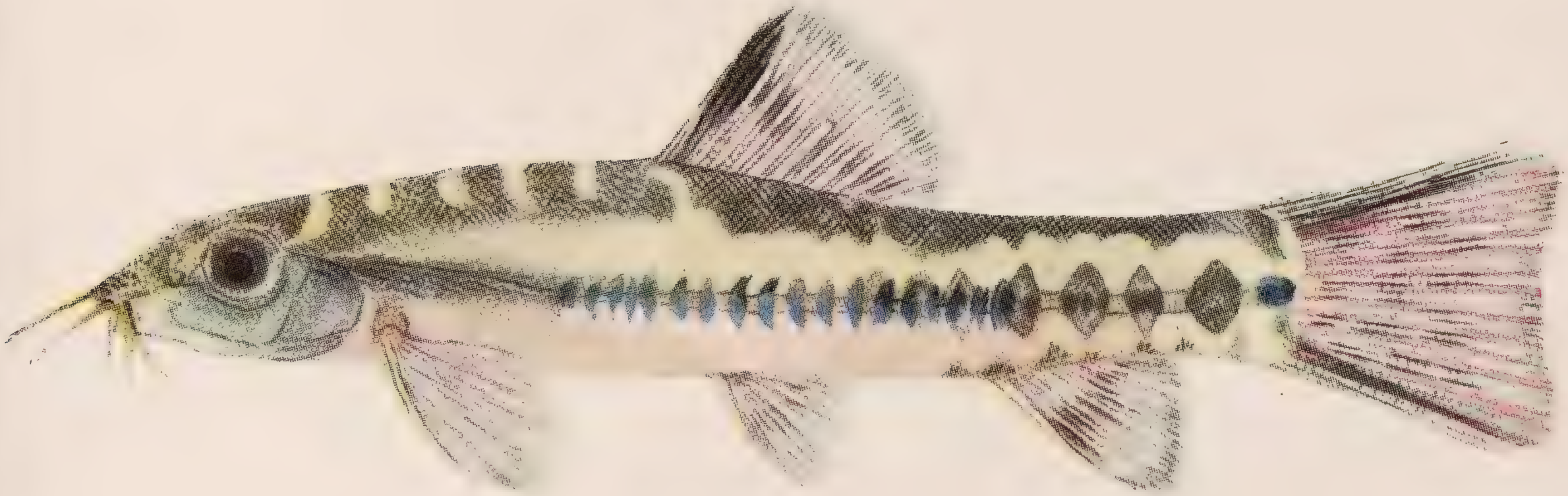
PLATE XXVI

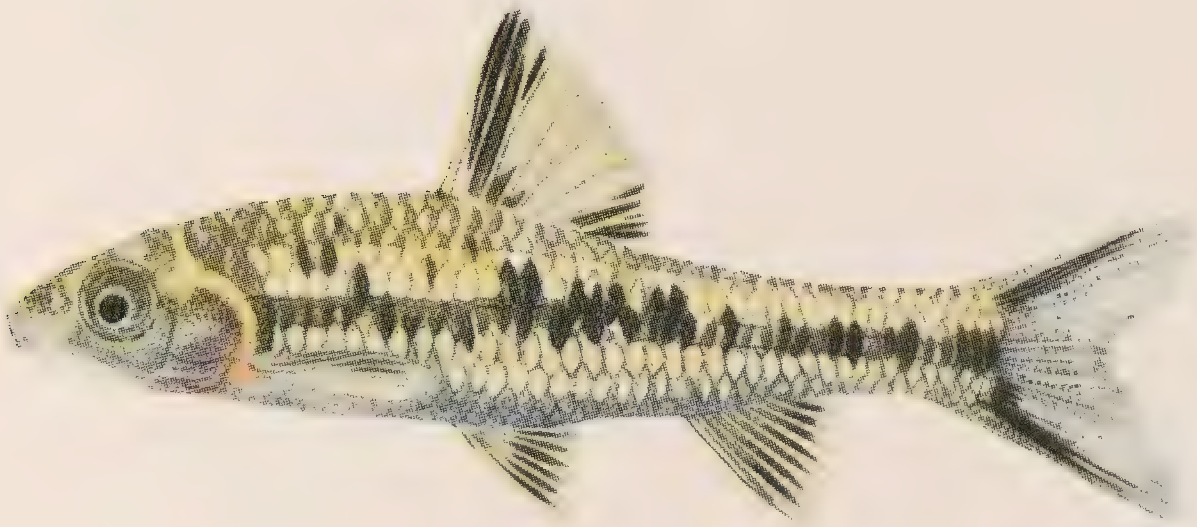
PLATE XXVI.

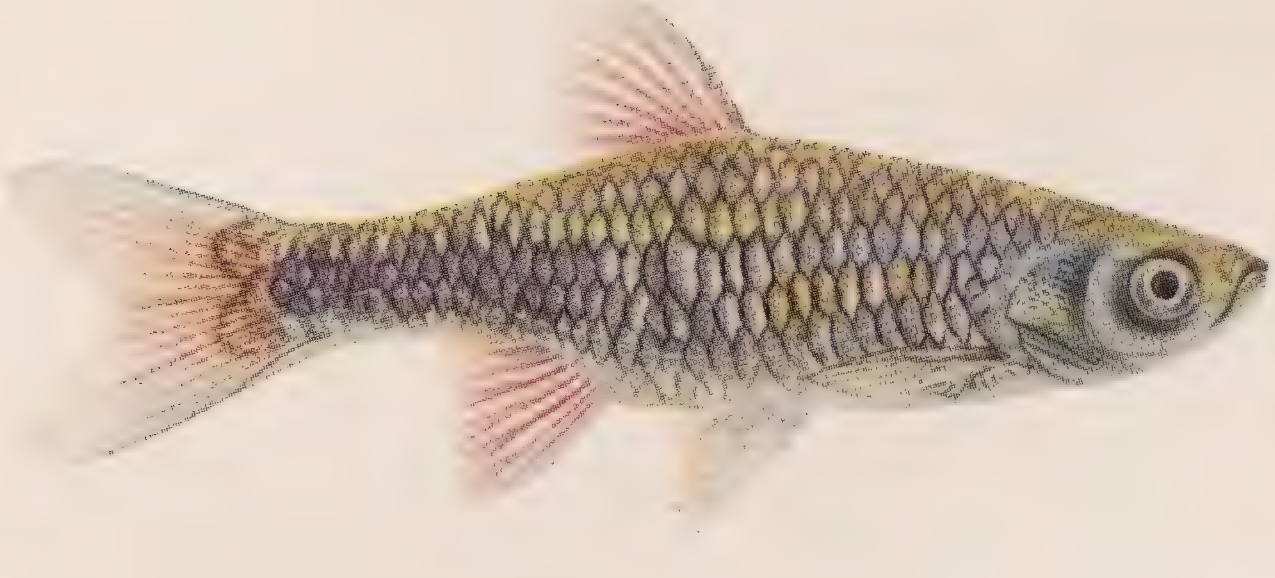
In color, from life.

Fig. 1. *Misgurnus mizolepis hainan*, type.
Fig. 2. *Nemacheilus pulcher*, type.
Fig. 3. *Sarcocheilichtnys hainanensis*, type.
Fig. 4. *Aphyocypris normalis*, type.









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Article III.—THE REPTILES OF HAINAN[1]

By Karl Patterson Schmidt[2]

With Abstracts from the Field Notes of Clifford H. Pope

Plate XXVII, Text Figures 1 to 17

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INTRODUCTION

The Island of Hainan occupies a position of especial interest for the student of the Chinese fauna. Lying almost wholly south of latitude 20° N., it is the southernmost extension of the Chinese Empire. In the same latitude as northern Indo-China and northern Luzon, its faunal relations are primarily Oriental and its fauna is more purely tropical in character than that of any other corner of China. In spite of its rather narrow separation from the mainland, its herpetological fauna contains a considerable number of endemic forms, though their number may be reduced in the future by discoveries in southern China and Indo-China. A number of forms first described from Hainan have since been recorded from the mainland, and the present studies, on the whole, serve to reduce the proportion of forms confined to the island.

The collection of amphibians and reptiles made by Mr. Clifford H. Pope for the Third Asiatic Expedition of The American Museum of Natural History, during his stay in Hainan from December 1922 to July 1923, is by far the most extensive in number of both specimens and species that has yet come from this island. Of no less importance is the excellence of the preservation of his specimens. Mr. Pope has given an interesting account of his work in Hainan in 'Natural History' (Pope, 1924).

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[1] Publications of the Asiatic Expedition of The American Museum of Natural History. Contribution No. 75.

[2] Assistant Curator of Reptiles and Amphibians, Field Museum of Natural History.

The present paper concerns only the reptiles[1] of Mr. Pope's collection, of which there are fifteen hundred and eighty specimens, representing forty-nine species. Listed according to the families represented, these specimens and species are distributed as follows:

	NUMBER OF GENERA	NUMBER OF SPECIES	NUMBER OF SPECIMENS
TURTLES			
Platysternidæ	1	1	17
Testudinidæ	4	5	77
Trionychidæ	2	3	7
LIZARDS			
Gekkonidæ	2	2	154
Agamidæ	4	4	398
Varanidæ	1	1	5
Lacertidæ	1	1	214
Scincidæ	5	5	101
SNAKES			
Typhlopidæ	1	1	37
Pythonidæ	1	1	7
Colubridæ (*sens. lat.*)	16	24	528
Crotalidæ	1	1	41

Five species, two lizards and three snakes, appear to be new:[2]

Sphenomorphus leveretti
Lygosaurus salsburyi
Sibynophis hainanensis
Natrix popei
Natrix andrewsi

Eleven more, five turtles, one lizard and five snakes, are additions to the fauna of Hainan:

Turtles
Platysternon megacephalum
Clemmys bealii
Cyclemys trifasciata
Pyxidea mouhotii
Pelochelys cantorii
Lizards
Eumeces quadrilineatus
Snakes
Elaphe tæniura vaillanti

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[1] A paper on the Amphibians of Hainan is in course of preparation by Dr. G. K. Noble and Clifford H. Pope.

[2] Advance diagnoses of the new forms were published in American Museum Novitates, No. 157, pp. 1–5, February 13, 1925. If Werner, 1924, antedates this, it will be necessary to place *Natrix andrewsi* in the synonymy of *Natrix ornaticeps* (Werner). This paper, however, was not received in the United States until about April, 1925, and Werner (1926) merely states that his paper has priority (which is, of course, probable), without mention of the date of publication.

Elaphe porphyracea
Ahætulla boiga
Bungarus multicinctus[1]
Calliophis macclellandii

While the entire collection was made with Nodoa as a base, the actual localities of collection lie within a considerable radius of Nodoa, most of the specimens having been brought in by native boys or hunters. Specimens collected in the mountainous area south of Nodoa have been so distinguished in the following account of the species.

In the course of studies for the present report, I have been indebted for advice especially to Dr. Leonhard Stejneger, whose contributions to Oriental herpetology make him the chief authority in this field. Many points have been discussed with Mr. Pope, whose first-hand knowledge has thus supplemented my laboratory acquaintance with the specimens. For access to the collections in their care and for friendly aid while studying those collections, I am indebted to Dr. Stejneger and Miss Doris Cochran at the United States National Museum, to Dr. G. K. Noble and Mr. Pope at The American Museum of Natural History, and to Dr. Thomas Barbour and Mr. Arthur Loveridge at the Museum of Comparative Zoölogy at Harvard University.

For the opportunity to report on the results of the work of the Third Asiatic Expedition, I am indebted to Mr. Roy Chapman Andrews, and the arrangement has been made possible by a cordial coöperative agreement between The American Museum of Natural History and the Field Museum of Natural History.

SUMMARY OF PREVIOUS CONTRIBUTIONS TO THE HERPETOLOGY OF HAINAN

Our knowledge of the reptiles of Hainan begins with the list published by Swinhoe in 1870, in which he enumerates nine species, identified by Günther, with some observations of his own upon them These are:

Varanus dracaena
Mabouia chinensis
Peripia peronii
Draco species
Calotes versicolor
Liolepis guttatus
Simotes species
Tropidonotus stolatus
Python molurus

Six of these species reappear in Boulenger's catalogues of specimens in the British Museum. *Mabouia chinensis* is apparently referred to *M. siamensis; Peripia peronii* to *Hemidactylus frenatus; Simotes* sp. to

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[1] Recorded by Boulenger from the Neumann collection.

Simotes violaceus; and *Tropidonotus stolatus* appears without change. The *Draco* sp. reappeared in the Whitehead collection as *Draco whiteheadi* Boulenger. Singularly enough, the *Varanus* was omitted from all subsequent lists, to reappear in the present collection, together with *Peropus mutilatus* (=*Peripia peronii*).

Bœttger in 1888 records a collection made in Hainan by Otto Herz. He lists the following sixteen species, of which thirteen are additions to the known reptile fauna:

Calotes versicolor
Liolepis bellii
Eumeces chinensis
Typhlops braminus
Ptyas korros
Ptyas mucosus
Tropidonotus quincunciatus
Tropidonotus stolatus
Hypsirhina bennetti
Hypsirhina chinensis
Hypsirhina plumbea
Naja tripudians
Hydrophis cyanocinctus
Hydrophis gracilis
Hydrophis viperinus
Trimeresurus erythrurus

In 1894 Bœttger makes three additions to this list from the collection of Bernhard Schmacker. These are:

Clemmys schmackeri, new species
Mabuia multifasciata
Simotes hainanensis, new species

In the 'Catalogue of Snakes' Boulenger records a collection of snakes received from J. Neumann, supposedly made at Hoi-How, Hainan. The species represented are:

Python molurus
**Tropidonotus tigrinus*
**Dinodon rufodorsatum*
Zamenis korros
**Zamenis spinalis*
**Coluber rufodorsatus*
**Coluber dione*
**Simotes chinensis*
Hypsirhina plumbea
Hypsirhina chinensis
**Bungarus candidus*
Naja tripudians
**Ancistrodon blomhoffii*

Eight of these thirteen species (marked * above) are new to the Hainan list; and, of these, six are North Chinese forms, which were scarcely to be expected in Hainan. Stejneger (1907, p. 318) suggests that these records require confirmation. Mell (1922, p. 104) states that Neumann also collected in northern China and he omits these species from his faunal list for Kwangtung and Hainan, as of erroneous record. Finally, not one of these six species occurs in the present extensive collection and, in view of this fact, I prefer to disregard the entire list. This deletes in addition to the northern species, only *Holarchus chinensis* from the Hainan list, *Bungarus multicinctus* reappearing in the present collection.

Cope recorded a small collection of seven species from Hainan in 1895. His additions to the fauna are the singular water-snake, *Trimerodytes balteatus*, and *Amblycephalus moellendorffii*. His *Holarchus dolleyanus* appears to be a synonym of *H. violaceus*.

The next important contribution to the fauna is Boulenger's report on the collection made by Mr. John Whitehead in the interior of Hainan, on the expedition which cost him his life. The reptiles recorded are:

**Draco whiteheadi*
**Acanthosaura hainanensis*
Calotes versicolor
Tropidonotus chrysargus

Two of these (marked *) are new species, and *Tropidonotus chrysargus* is a further addition to the fauna.

In 1906 Siebenrock described *Amyda steindachneri*, from Hainan and Indo-China, and added records of *Ocadia sinensis* and *Amyda sinensis* to the Hainan list. A single species of turtle (*Clemmys schmackeri*) was previously known from Hainan.

Barbour, in 1908 and 1909, records a number of specimens secured from the Owston collection, of which four are new to Hainan and three are new species. His additions are:

Goniurosaurus hainanensis
Natrix æquifasciata
Holarchus nesiotis
Boiga multimaculata

Following the nomenclature of Stejneger's important 'Herpetology of Japan' (which contains some valuable remarks on the Hainan fauna), Barbour's paper introduces some of the Hainan species under the names now in use. In 1912 Barbour added *Psammodynastes pulverulentus* to the Hainan list, and discussed several of the Hainan species.

Vogt, in 1913, records a collection of fourteen species from Hainan, collected by Herr Schoede and presented to the Berlin Museum. Vogt concludes his paper with a list of the reptiles known from Hainan, enumerating four turtles, nine lizards, and twenty-five snakes. This list omits, *Peropus mutilatus*, *Varanus salvator*, *Natrix chrysarga*, *Boiga multimaculata*, and *Disteira gracilis* and *viperina*. With these omissions, the omission of the entire Neumann list, and the additions above noted, the total species of reptiles known from Hainan in 1913 would be four turtles, eleven lizards, and twenty-one snakes, a total of thirty-six species.

Stanley (1914) records a few specimens from Hainan in the Shanghai Museum.

Mell and Vogt in 1922 gave a nominal list of the forms recorded from Hainan, and their notes on the Kwangtung fauna are of especial importance to the study of that of Hainan.

Dr. Malcolm A. Smith's 'Journey to the Interior of Hainan' (Smith, 1923), undertaken in 1923 during Mr. Pope's stay at Nodoa, resulted in the collection of thirty species of reptiles, the most extensive collection from Hainan thus far recorded. It is reported upon in two highly interesting papers, a narrative of the trip, and a report on the collection (Smith, 1923*a*). Four species of reptiles, two lizards and two snakes, are described as new, and seven more are additions to the known fauna.[1] These eleven[2] forms are the following:

Takydromus sexlineatus
**Gekko similignum*
Hemidactylus garnoti
**Tropidophorus hainanus*
Sphenomorphus indicus
Leiolopisma laterale
Natrix percarinata
Pseudoxenodon melli
Lycodon subcinctus
**Achalinus meridianus*
**Amblycephalus carinatus hainanus*

The new species are marked with an asterisk.

Clifford H. Pope (1924, p. 218) records having seen the skin of a very large cobra, presumably a king cobra, at Nodoa. While this form is certainly to be expected in Hainan, I have omitted it from the final list pending the examination of a specimen.

ANNOTATED LIST OF THE SPECIES COLLECTED

TESTUDINATA

Platysternidæ

Platysternon megacephalum Gray

Figure 1

Platysternon megacephalum Gray, 1831, Proc. Zoöl. Soc. London, p. 107.

Platysternum megacephalum Boulenger, 1889, 'Cat. Chelon, Brit. Mus.,' p. 46, figs. 13–14. Siebenrock, 1907, Sitzber. Akad. Wiss. Wien (math.-natur.), CXVI, Abt. 1, p. 1742, fig. 2; 1909, Zool. Jahrb., Suppl., X, p. 450.

Seventeen specimens, A. M. N. H. Nos. 30108–30124, were collected by Mr.Pope in Hainan, all, apparently, being from the mountains some distance to the south. They form the first record of this species from Hainan.

The specimens form a series from a carapace length of 88 mm., with a sharply defined ventral marking, to one of 184 mm., without a trace of the ventral pattern, and with effaced growth-rings. The smallest specimen has only one growth-ring on its horny shields. I do not find any sex differences in measurements in this series, beyond the usual concavity of the plastron in males.

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[1] Dr. Smith's changes in the nomenclature of the sea-snakes, in his fine monograph of this group (1926), are incorporated in the list at the end of this paper.

[2] *Boiga multimaculata* and *Amblycephalus moellendorffii* are included in the list of additions by Smith.

The measurements[1] of the shells of ten specimens are shown below, with the average for sixteen.

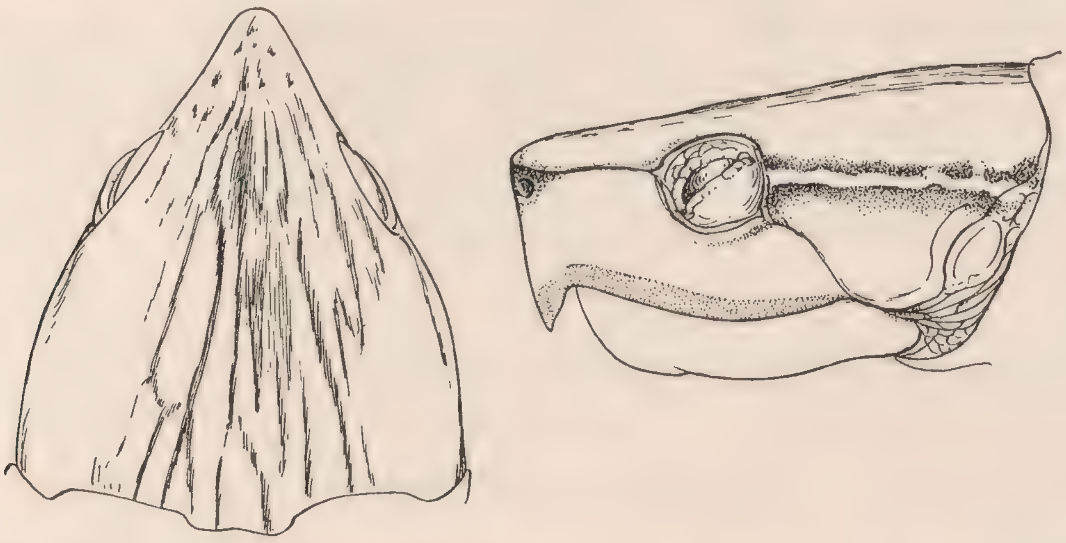

Fig. 1. *Platysternon megacephalum*, A. M. N. H. No. 30109.
Head from above and from side, life size.

A. M. N. H. No.	Length Carapace	Breadth Carapace	Greatest Depth	Length Plastron	Length Tail
30108	85 mm.	71 mm.	26 mm.	64 mm.	90 mm.
30109	98	81	31	76	104
30112	110	85	37	85	121
30113	115	90	36	93	123
30115	134	105	45	101	153
30117	148	100	43	118	158
30118	153	114	49	125	183
30122	166	114	50	125	182
30123	176	125	56	140	198
30124	184	129	62	139	..
Average of 16 specimens	136	101	43	107	146

"All of the specimens of this species were brought out of the mountains by a Loi.

"These turtles walk with their bodies slightly raised from the ground, with their tails dragging. Two specimens were timed and made respectively 25 and 27 feet per minute on level ground covered with short grass. When at rest, they usually draw the tail up close to one side. They bite when teased, but tend to hold on rather than to snap. When tapped on one side of the shell they raise the opposite side, apparently leaning toward the annoying object, like a toad (or like a snapping turtle)." (C.H.P.)

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[1] In this, as in subsequent species, the length of carapace and plastron is on the median line; the breadth is the greatest breadth, and the depth the greatest vertical depth of the shell, all measurements being taken with calipers. The length of the tail is from the middle of the posterior border of the plastron

Testudinidæ

Ocadia sinensis (Gray)

Figure 2

Emys sinensis Gray, 1834, Proc. Zoöl. Soc. London, p. 53.

Ocadia sinensis Gray, 1870, 'Suppl. Cat. Shield Rept. Brit. Mus.,' I, p. 35. Boulenger, 1889, 'Cat. Chelon. Brit. Mus.,' p. 85. Siebenrock, 1903, Sitzber, Akad. Wiss. Wien (math.-natur.), CXII, Abt. 1, p. 334; 1906, Zool. Anz., XXX, p. 578. Stejneger, 1907, Bull. U. S. Nation. Mus., No. 58, p. 489, Pl. xxviii, text figs. 377–381. Siebenrock, 1909, Zool. Jahrb., Suppl., X, p. 470. Smith, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 197.

Twenty-four specimens of this species, A. M. N. H. Nos. 30173–30196, are in the collection. This series offers no discrepancies from the excellent descriptions of Stejneger and Siebenrock.

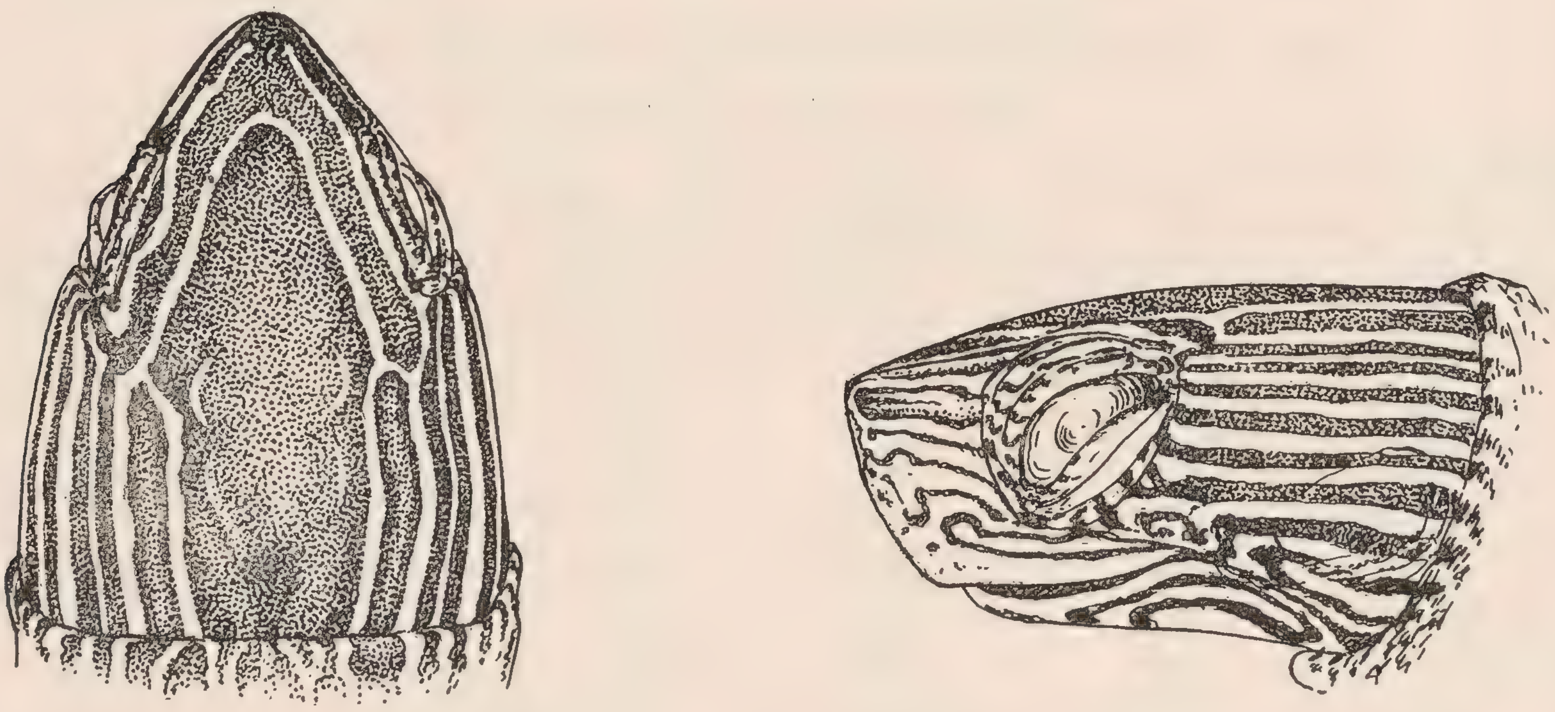

Fig. 2. *Ocadia sinensis,* A. M. N. H. No. 30184.
Head from above and from side, life size.

The measurements of ten specimens of this species are as follows:

A. M. N. H. No.	Sex	Length Carapace	Breadth Carapace	Depth	Length Plastron	Tail Length
30173	juv.	58 mm.	50 mm.	25 mm.	49 mm.	33 mm.
30176	juv.	80	64	37	67	40
30177	juv.	89	70	37	75	43
30179	♀	101	79	45	87	43
30184	♂	110	82	43	94	52
30189	♀	122	92	53	106	53
30191	♀	133	94	52	110	54
30194	♀	149	107	61	127	52
30195	♀	196	140	79	174	65
30196	♀	217	161	86	192	72
Average of 24 specimens		117	87	48	100	48

The uppermost narrow line in the head-pattern may be absent in large specimens of this species.

Clemmys bealii (Gray)

Figure 3

Cistuda bealii Gray, 1831, 'Syn. Rept.,' p. 71.

Clemmys bealii Strauch, 1862, 'Chelon. Stud.,' p. 32. Boulenger, 1889, 'Cat. Chelon. Brit. Mus.,' p. 107. Siebenrock, 1909, Zool. Jahrb., Suppl., X, p. 482. Mell, 1922, Arch. Naturg., LXXXVIII, Abt. A., Heft 10, p. 109. Vogt, 1922, idem, p. 135.

Clemmys bealii var. *quadriocellata* Siebenrock, 1903, Sitzber. Akad. Wiss. Wien (math.-natur.), CXII, Abt. 1, p. 336, Pl. i, figs. 1–2; 1909, Zool. Jahrb., Suppl., X, p. 482.

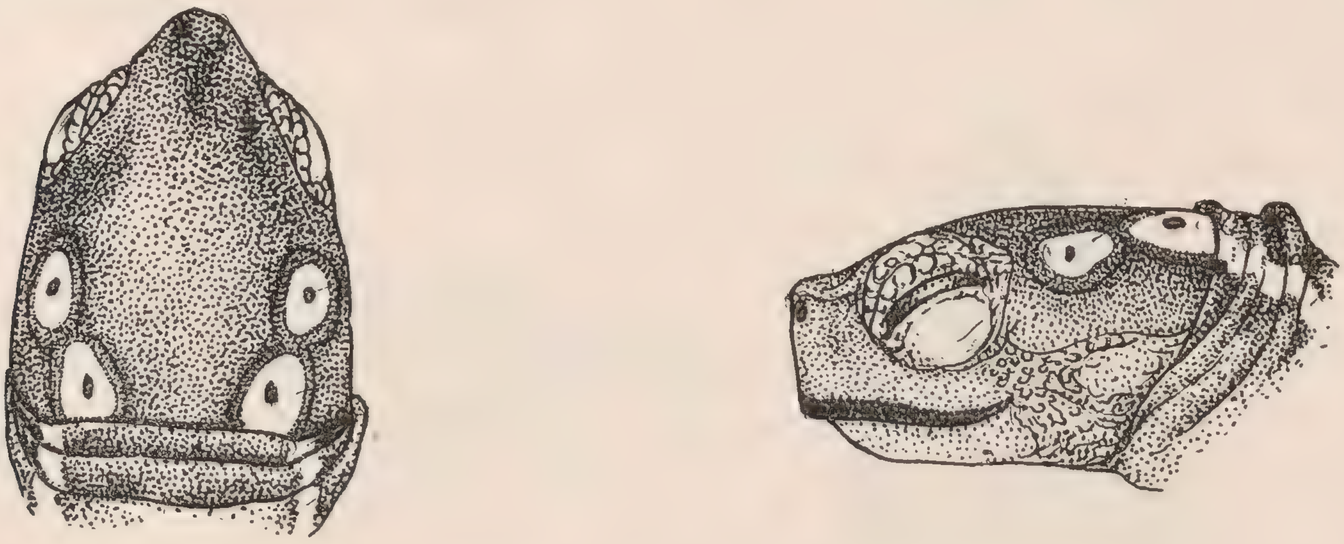

Fig. 3. *Clemmys bealii*, A. M. N. H. No. 28337.
Head from above and from side, × 2.

Five specimens of this strikingly handsome species, A. M. N. H. Nos. 28337–28341, are in the collection, all brought from the mountains south of Nodoa. This form has not previously been recorded from Hainan.

In the largest specimen the temporal ocellæ are faded to a uniform gray, though still perfectly distinct. These are bright yellow rings surrounding a black spot in the four remaining specimens, and in all five there are two ocellæ on each side.

The measurements of this series are as follows:

A. M. N. H. No.	Sex	Length Carapace	Breadth Carapace	Depth	Length Plastron	Length Tail
28337	♂	58 mm.	59 mm.	25 mm.	45 mm.	28 mm.
28338	♂	78	67	31	62	30
28341	♂	121	58	41	100	47
28340	♀	121	89	42	102	41
28339	♀	129	91	46	108	39

The tail is somewhat longer in male than in female specimens, proportionately much longer in the juvenile specimen than in the larger ones. The smallest specimen is also proportionately wider and deeper.

These specimens evidently confirm the surmise of Vogt that *quadriocellata* and *bealii* are identical. The types, redescribed by Boulenger, consisted of a shell and a stuffed specimen, and it is evident that in a dried skin one of the pairs of ocellæ might have become obscure.

Clemmys mutica (Cantor)

Figure 4

Emys mutica Cantor, 1842, Ann. Mag. Nat. Hist., (1) IX, p. 482.

Damonia mutica Boulenger, 1889, 'Cat. Chelon, Brit. Mus.,' p. 96.

Clemmys mutica, Siebenrock, 1910, Ann. Naturh. Hofmus. Wien, XXIII, p. 312, Pl. xii–xiii.

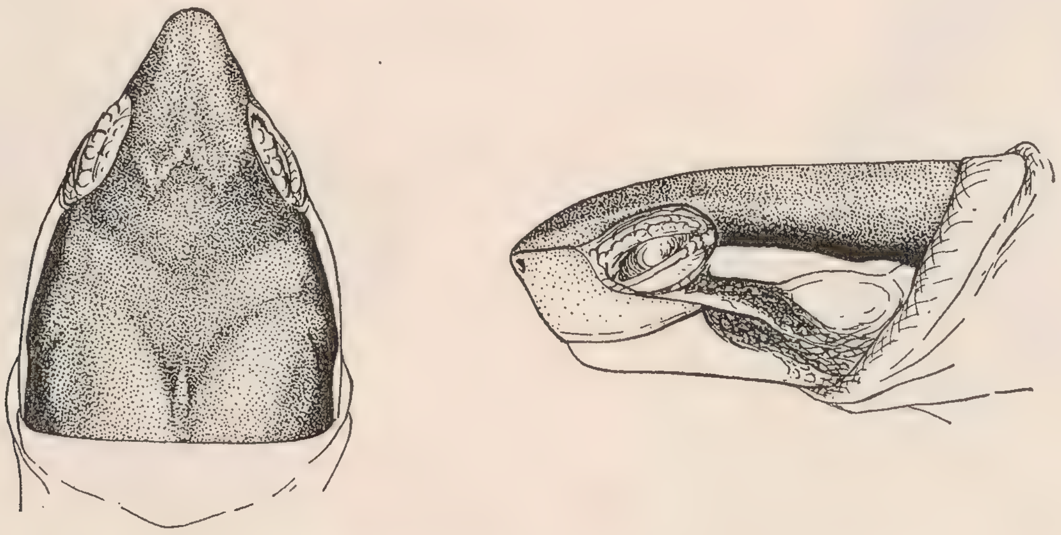

Fig. 4. *Clemmys mutica*, A. M. N. H. No. 30170.
Head from above and from side, life size.

Clemmys schmackeri Bœttger, 1894, Ber. Senck. Ges., p. 129, Pl. iii, fig. 1. Siebenrock, 1906, Zool. Anz., XXX, p. 378; 1909, Zool. Jahrb., Suppl., X, p. 482. Mell, 1922, Arch. Naturg., LXXXVIII, Abt. A, Heft 10, p. 109.

Nineteen specimens of this species, A. M. N. H. Nos. 30154-30172, are in the collection.

This is a well-marked species, with an invariable head pattern. Siebenrock's reference of *Clemmys schmackeri* to this species seems amply justified, as his excellent figures of a Formosan specimen leave little room for doubt of the identity of the form from Hainan with those described by him.

The measurements of ten specimens are as follows:

A. M. N. H. No.	Sex	Length Carapace	Breadth Carapace	Depth	Length Plastron	Length Tail
30154	juv.	65 mm.	54 mm.	32 mm.	56 mm.	21 mm.
30157	juv.	75	61	35	64	27
30158	juv.	93	71	40	79	33
30159	juv.	100	74	43	86	36
30160	juv.	110	83	45	91	45
30164	♀	118	87	48	96	37
30166	♀	132	97	51	109	48
30168	♂	145	106	54	122	47
30171	♀	149	108	58	129	41
30172	♀	154	110	61	127	50
Average of 19 specimens		114	85	46	96	40

The fifth vertebral shield, usually nearly equal in size to the fourth, is only half as large in No. 30165. An additional, irregular, fourth vertebral is present in No. 30155. The lateral yellow stripe of the head exhibits minor variations in form. It is usually continuous on the neck, with a straight upper border. A median nuchal stripe, which may be continuous with one at the base of the neck, may be present or absent. There is great variation in the amount of black color on the plastron in this series. No. 30154 (juv.) is uniform black beneath except for the edge of the marginals, the lower angle of the bridge, and a median line, which are yellow. In No. 30162 the plastral shields are black with a broad yellow border on their anterior and median sides. In No. 30168 the yellow color considerably exceeds the black, and black spots are absent from the gular shields.

Deposits of a red pigment (presumably from the water in which the turtles live) frequently obscure the yellow areas of the plastron.

Cyclemys trifasciata (Bell)

Figure 5

Sternothærus trifasciata Bell, 1825, Zoöl. Journ. II, p. 305, Pl. xiii.

Cyclemys trifasciata Boulenger, 1889, 'Cat. Chelon. Brit. Mus.,' p. 133. Siebenrock, 1907, Sitzber. Akad. Wiss. Wien (math-natur.), CXVI, Abt. 1, p. 1763; 1909, Zool. Jahrb., Suppl., X, p. 502. Mell, 1922, Arch. Naturg., LXXXVIII, Abt. A, Heft 10, p. 108.

Twenty-eight specimens of this species, A. M. N. H. Nos. 30126–30153, form the first records of this species from Hainan.

The measurements of a series of ten specimens are as follows:

A. M. N. H. No.	Length Carapace	Breadth Carapace	Depth	Length Ant. Lobe	Plastron Post. Lobe
30127	58 mm.	49 mm.	25 mm.	23 mm.	29 mm.
30131	65	56	24	25	31
30132	76	65	26	29	36
30135	87	67	34	36	45
30137	99	73	40	42	53
30140	117	85	43	47	59
30149	136	97	49	55	66
30150	155	119	59	65	88
30152	173	122	65	70	94
30153	200	154	87	86	114
Average of 28 specimens	110	87	42	45	58

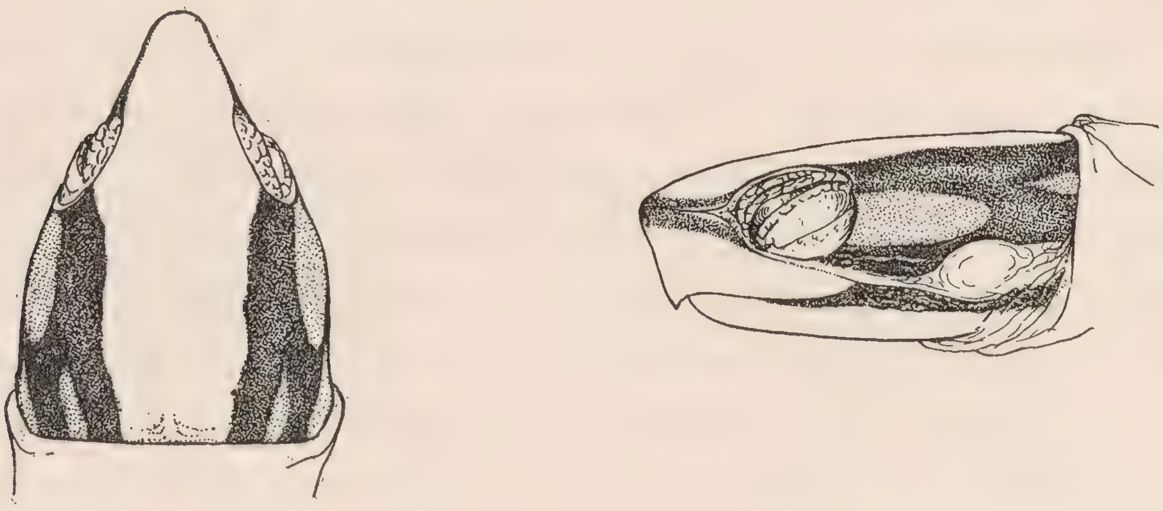

Fig. 5. *Cyclemys trifasciata*, A. M. N. H. No. 30144.
Head from above and from side, life size.

As in other turtles with a hinged shell, the hinge is not developed in the younger specimens. In the present series it is not recognizable in specimens up to about 90 mm. in length, while those over 100 mm. have a well-developed and functional hinge.

The dorsolateral black lines of this species are absent in juvenile specimens and first appear in specimens about 100 mm. long. In the largest specimen there are supplementary black markings which extend from the lateral lines to the marginals, one on each costal shield. The whole plastron, with the exception of a narrow yellow outer border, is black in the young. By the growth of the shields, the central part of the plastron becomes yellow in adults, with rays of black from the latero-posterior black areas on each shield. This change of pattern conditioned by growth is evidently the same as in *Clemmys mutica.* Deposits of extraneous red pigment are frequent.

"This species, like *Clemmys mutica* and *Ocadia sinensis*, is common near Nodoa. Two eggs, apparently ready to be laid, were taken from one of these turtles on May 17th. They were oval, 27 mm. by 50 mm., with a hard white shell." (C. H. P.)

Pyxidea mouhotii (Gray)

Figure 6

Cyclemys mouhotii Gray, 1862, Ann. Mag. Nat. Hist., (3) X, p. 157. Boulenger, 1889, 'Cat. Chelon. Brit. Mus.,' p. 132.

Pyxidea mouhotii Gray, 1863, Proc. Zoöl. Soc. London, p. 175. Siebenrock, 1903, Sitzber. Akad. Wiss. Wien (math.-natur.), CXII, Abt. 1, p. 345, Pl. I, figs. 3–4; 1909, Zool. Jahrb., Suppl., X, p. 505.

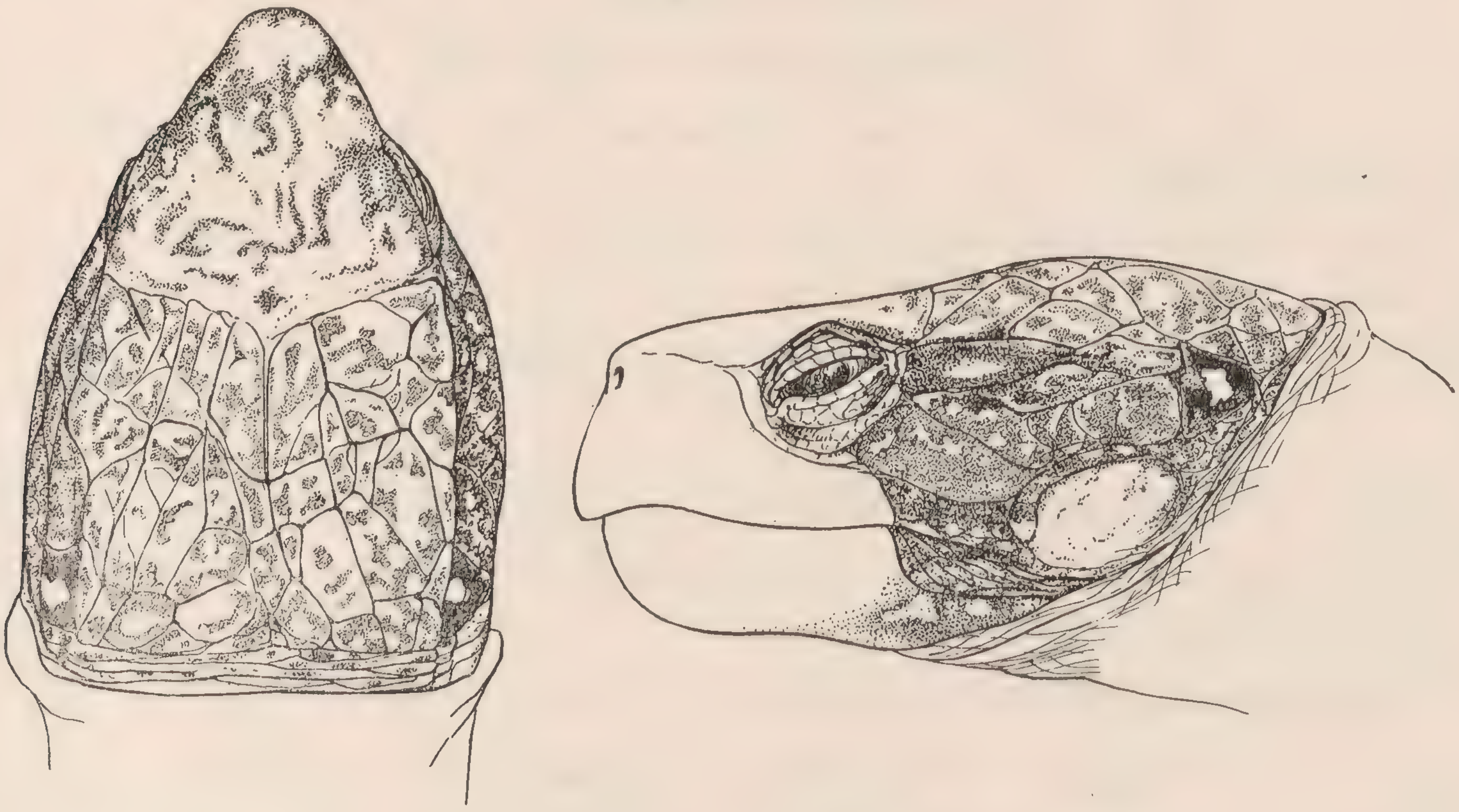

Fig. 6. *Pyxidea mouhotii*, A. M. N. H. No. 28336.
Head from above and from side, life size.

A single specimen of this species is in the collection, A. M. N. H. No. 28336, ♀. It was secured at Nam Fong.

The length of the carapace is 163 mm., its breadth 119 mm. The greatest depth is 67 mm. The length of the anterior lobe of the plastron is 70 mm.; of the posterior lobe 87 mm.; its width at the hinge 92 mm.; the width of the bridge 52 mm. The length of the tail is 35 mm. The lengths of the sutures between the shields of the plastron are as follows: gulars, 25 mm.; humerals, 17 mm.; pectorals, 28 mm.; abdominals, 36 mm.; femorals, 20 mm.; anals 30 mm.

The color of the carapace is a uniform light brown, each costal with a diffuse black marking at its upper posterior corner, below the lateral keel. The plastron is grayish brown, with scattered small black spots. The outer borders of the gulars, humerals, femorals, and anals are black, and there is a lateral black spot on each pectoral and on one of the abdominals. The head is brown with black spotting or vermiculation, with a yellow spot, outlined with black, behind and above the tympanum.

The specimen agrees well with Günther's figure (1864, Rept. Brit. India, Pl. IV, fig. *D*), and with Boulenger's description. The retention of the separate genus, *Pyxidea* Gray, for it seems justified, if only by the striking difference in habitus between it and the more aquatic *Cyclemys*.

It was previously known from Siam and Indo-China, and it has not been recorded from Kwangtung, even in the extensive collections of Mell.

Trionychidæ

Amyda sinensis (Wiegmann)

Trionyx (Aspidonectes) sinensis WIEGMANN, 1834, Nova Acta Akad. Leop. Carol, XVII, p. 189.

Trionyx sinensis BOULENGER, 1889, 'Cat. Chelon. Brit. Mus.,' p. 256. SIEBENROCK, 1902, Sitzber. Akad. Wiss. Wien (math.-natur.), CXI, Abt. 1, p. 821, fig. 4; 1903, idem, CXII, p. 349; 1906, Zool. Anz., XXX, p. 581; 1907, Sitzber. Akad. Wiss. Wien (math.-natur.), CXVI, Abt. 1, p. 1741; 1909, Zool. Jahrb., Suppl., X, p. 601.

Amyda sinensis STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 524.

Four specimens of this species, A. M. N. H. Nos. 28344–28346, 30125, are in the collection from Hainan.

The measurements of these four specimens are as follows:

A. M. N. H. No.	SEX	LENGTH CARAPACE	BREADTH CARAPACE	DEPTH	LENGTH PLASTRON
30125	juv.	47 mm.	43 mm.	17 mm.	36 mm.
28346	♀	103	86	29	77
28344	♀	177	154	50	134
28345	♀	236	194	74	183

The ventral pattern of this species is very distinct in the two smaller specimens, distinguishable in the next, and reduced to two diffuse lateral spots in the largest. It is invariable in general arrangement and appears to differ regularly from the pattern of *Amyda japonica* figured by Stejneger (1907, Pl. xxxv). I shall return to the interesting topic of variation in this species and its near relatives in connection with studies on the mainland specimens of *Amyda* collected by the Third Asiatic Expedition. There can be no question, however, of the applicability of the name *sinensis* (type locality near Macao) to the Hainan specimens at hand.

Amyda steindachneri (Siebenrock)

Trionyx steindachneri Siebenrock, 1906, Zool. Anz., XXX, p. 579, Fig.; 1907, Sitzber. Akad. Wiss. Wien (math.-natur.), CXVI, Abt. 1, p. 1766, Pl.; 1909, Zool. Jahrb., Suppl., X, p. 600. Vogt, 1913, Sitzber. Ges. Naturf. Freunde Berlin, p. 225. Mell, 1922, Arch. Naturg., LXXXVIII, Abt. A, Heft 10, p. 110. Vogt, 1922, idem, p. 136.

A single female specimen, A. M. N. H. No. 28343, represents this well-characterized species in the present collection.

The nasal septum is provided with papillæ. The whole anterior border of the carapace is tuberculate. The carapace is set with spinose tubercles, not confluent into rows, heaviest posteriorly. The venter is diffusely mottled with gray, with no trace of large black spots. The pattern of the side of the neck, shown in Siebenrock's figure, is faint but distinguishable.

The length of the carapace is 161 mm.; its greatest breadth 135 mm.; greatest depth 50 mm.; length of plastron 127 mm.

Pelochelys cantorii Gray

Figures 7 and 8

Pelochelys cantorii Gray, 1864, Proc. Zoöl. Soc. London, p. 90, Figs.

Pelochelys cantoris Boulenger, 1889, 'Cat. Chelon. Brit. Mus.,' p. 263, Fig. 69. Siebenrock, 1902, Sitzber. Akad. Wiss. Wien (math. natur.), CXI, Abt. 1, p. 832, Fig. 12; 1903, idem, CXII, Abt. 1, p. 350; 1909, Zool. Jahrb., Suppl., X, p. 607.

Two specimens of this form were brought to Nodoa. A. M. N. H. No. 28342 consists of head and front legs, with the skull prepared, and No. 23541, Feb. 1923, is a complete skeleton.

The figure of the skull given by Gray is defective, and I have accordingly presented drawings of the skull and hyoid of the present specimen. The body of the hyoid is remarkable for the presence of four pairs of ossifications, a generic character which distinguishes *Chitra* and *Pelochelys* sharply from other Trionychidæ.

The species has not before been known from Hainan, but is known from Kwangtung.

SAURIA

Gekkonidæ

Hemidactylus frenatus Duméril and Bibron

Figure 9

Hemidactylus frenatus Duméril and Bibron, 1836, 'Erpet. Gen.,' III, p. 366. Boulenger, 1885, 'Cat. Lizards Brit. Mus.,' I, p. 120. Bœttger, 1894, Ber. Senck. Ges., p. 131. Stejneger, 1907, Bull. U. S. Nation. Mus. No. 58, p. 172, figs. 167–168. Vogt, 1913, Sitzber. Ges. Naturf. Freunde Berlin, p. 225. Smith, 1923, Journ. Nat. His. Soc. Siam, VI, p. 197.

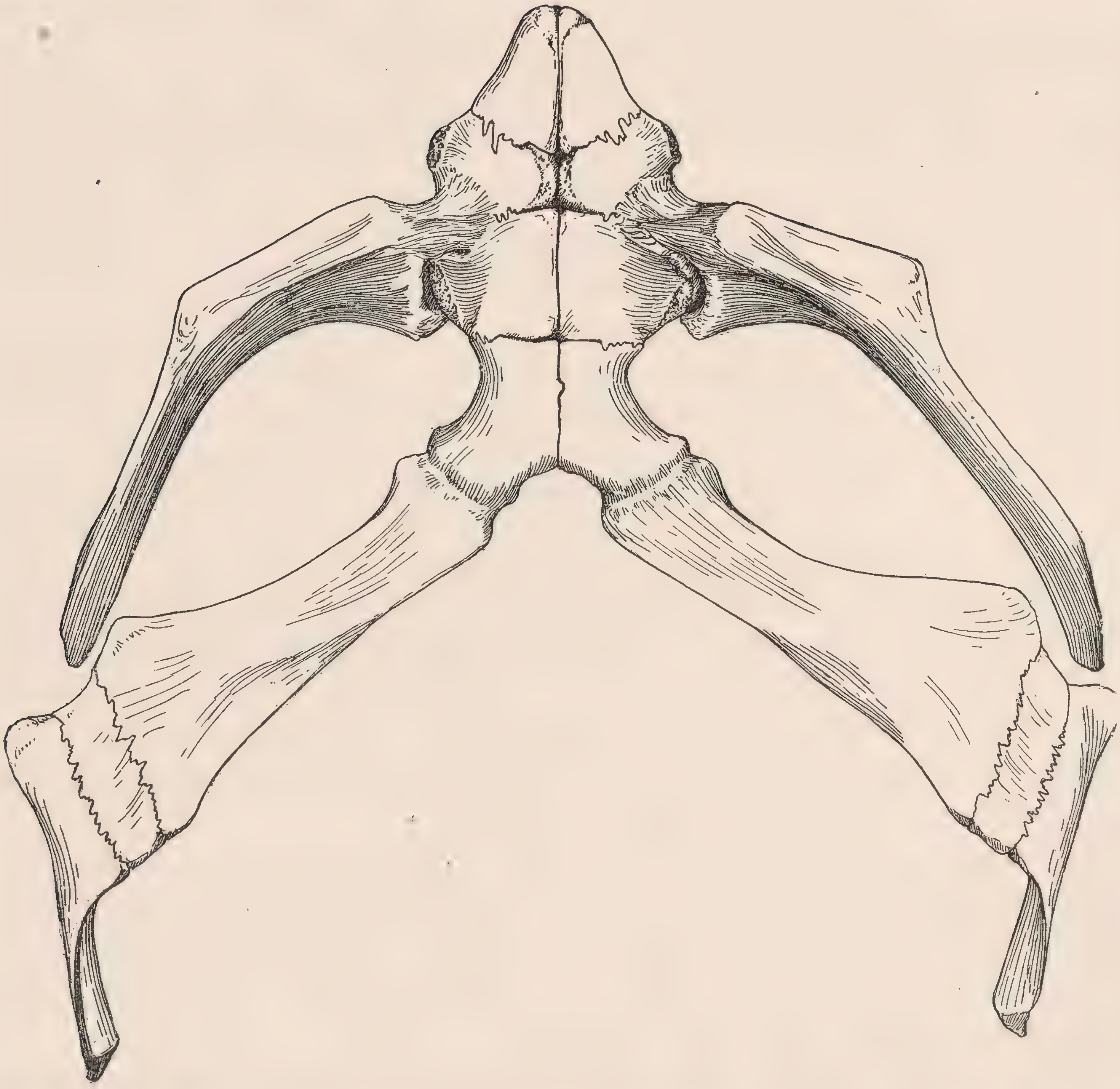

Fig. 7. Ventral view of hyoid of *Pelochelys cantorii*, A. M. N. H. No. 28342.
(Terminal series of ossifications wanting), life size.

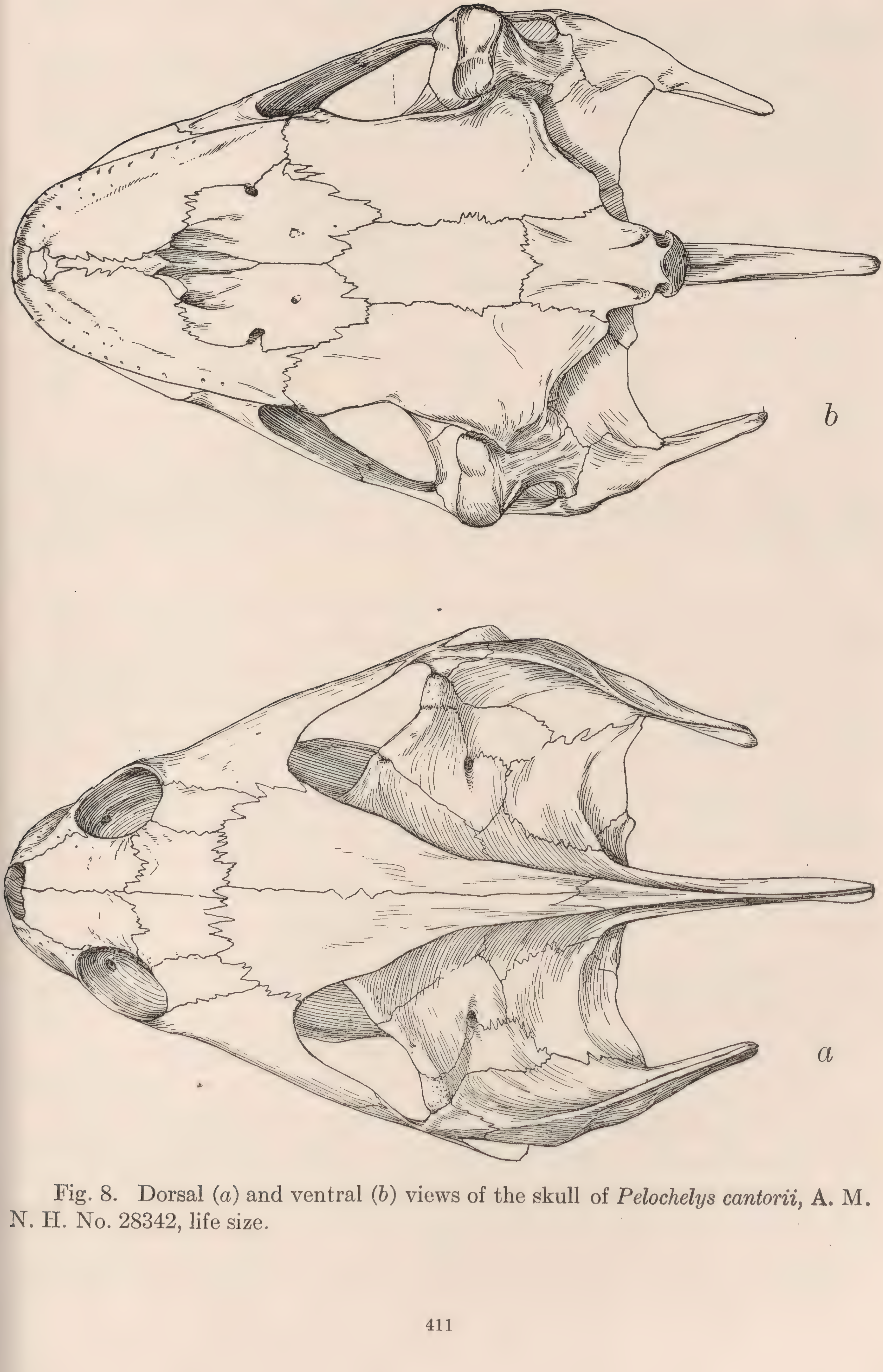

Fig. 8. Dorsal (*a*) and ventral (*b*) views of the skull of *Pelochelys cantorii*, A. M. N. H. No. 28342, life size.

One hundred and fifteen specimens of this species, A. M. N. H. Nos. 30298–30412, were collected at Nodoa.

These specimens agree in their principal characters with published accounts of this species. They exhibit a surprising variability in the arrangement of their chin shields, contrasting with the constancy of this character in *Peropus mutilatus.*

In the present series, seventy-five specimens have two pairs of chin shields, seventeen have an extra one on one side, and twenty-three have three pairs of enlarged chin shields, of which the last may be either in contact with the adjacent labials or separated from them. The length of the suture between the first pair is very variable. In two specimens they are separated by small granules. The second pair of these shields is separated from the labials in a single specimen, thus producing an arrangement very similar to the normal one in *Hemidactylus garnotii.* This variation is shown in the accompanying figures.

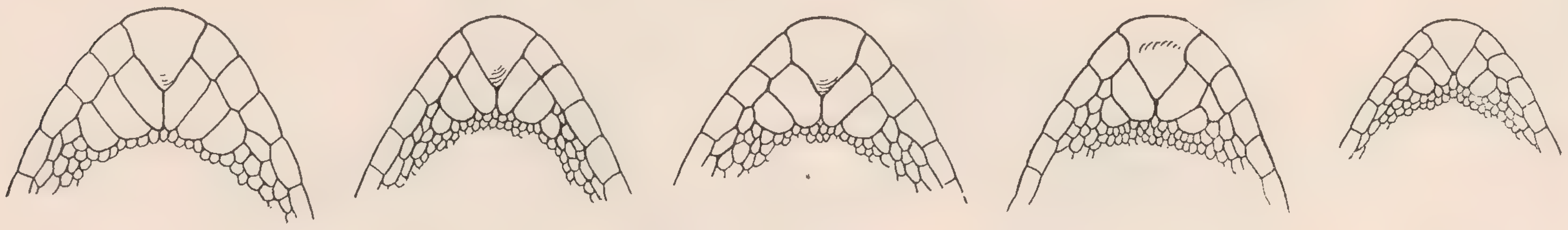

Fig. 9. Variation in the postmentals of *Hemidactylus frenatus.*

In A. M. N. H. Nos. 30320 and 30326 there are three pairs of chin shields, all in contact with the labials in the first, only two pairs in the second. In Nos. 30359 and 30325 there are two pairs of chin shields, both in contact with the labials in the former, only the anterior pair in the latter (an approach to the arrangement of H. *garnotii*). In No. 30303, the chin shields are separated by a small median postmental. All × 3.

Hemidactylus garnotii is recorded from Hainan by Smith, but it is certainly not represented in the present collection. *Hemidactylus bowringii* may also be expected to occur in Hainan.

Peropus mutilatus (Wiegmann)

Hemidactylus mutilatus Wiegmann, 1834, 'Herpet. Mex.,' I, p. 54.

Peropus mutilatus Girard, 1858, 'Herpetol. U. S. Expl. Exp.,' p. 277. Stejneger, 1907, Bull. U. S. Nation. Mus., No. 58, p. 180, Figs. 171–173.

? *Peripia peronii* Swinhoe, 1870, Proc. Zoöl. Soc. London, p. 239.

Thirty-nine specimens, A. M. N. H. Nos. 30413–30451, of this widely distributed species were collected in Hainan by Mr. Clifford H. Pope.

This form was recorded in Swinhoe's paper on Hainan reptiles in 1870, but the record is not confirmed by Boulenger, who lists *Hemidactylus frenatus* from Hainan, collected by Swinhoe, in the 'Catalogue of Lizards.' The fact that the species now reappears, and that it is evidently abundant in Hainan, seems to make it probable that Swinhoe really did have some specimens of this species in his collections, though his record has been ignored in subsequent lists of Hainan reptiles.

The present series agrees excellently with the descriptions of Stejneger and Boulenger, and I find no important differences between the Hainan specimens and the large Polynesian series in the American Museum, collected by the Whitney South Sea Expedition.

"Among the live geckos we kept in a glass jar I noticed two distinct kinds, one with only four well-developed toes and spines on the tail, and one with five digits and a smooth, broad tail. The first of these (*Hemidactylus frenatus*) was a comparatively poor climber, and could not climb the vertical glass sides of the jar, while the other (*Peropus mutilatus*) could easily do so.

"I saw a *Peropus* deliberately lick the bottom of his digits. He held his front foot to his mouth and, by projecting his tongue, licked the under surfaces of his fingers with the under side of his tongue.

"About July 13th I saw the first very small gecko seen here, and others on July 18th, 24th, and 28th, evidently just hatched." (C. H. P.)

Agamidæ

Draco whiteheadi Boulenger

Draco sp., Swinhoe, 1870, Proc. Zoöl. Soc. London, p. 240.

Draco whiteheadi Boulenger, 1899, Proc. Zoöl. Soc. London, p. 956, Pl. LXVI, fig. 1. Barbour, 1909, Proc. New England Zoöl. Club, IV, p. 63. Smith, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 199.

Sixty-nine specimens, A. M. N. H. Nos. 30890–30958, of this species were secured near Nodoa, sixty of which were collected on December 12th and 16th, 1922.

Without a series of the mainland *Draco maculatus*, I am unable to form an opinion as to the degree of difference between these species. The coloration of the wings appears to be different. The color-pattern of the gular appendage in the male is variable; the colors are no longer discernible.

This species, like *Calotes versicolor*, apparently does not reproduce its tail.

This is another form not seen wild by Mr. Pope. It is evidently found only at a distance from Nodoa. The series mentioned was said to have come from six miles southwest of Nodoa, across the river.

Summary of Measurements

	Sex	No. of Specimens	Extremes	Average
Length of Body	♂	51	39- 80 mm.	....
	♀	18	37- 72	....
Total Length	♂	45	108-218	....
	♀	17	102-197	....
Length of Tail	♂	45	69-143	....
	♀	17	65-125	....
Ratio of Tail to Total Length	♂	45	.62-.66	.64
	♀	17	.63-.66	.64

"In my December field notes I have the following entry: Yesterday nineteen of the so-called 'flying-snakes' were brought in. They are lizards, of course. I tied a thread to the foot of one of them and tried letting him fall from various heights. The 'wings' were invariably spread as soon as the lizard was allowed to fall or move downward rapidly. When dropped from a fifteen-foot elevation it landed lightly on the grass below, although it fell nearly vertically; it did not attempt to glide. The 'wings' seem to be simply an aid to its jumps.

"Their protective coloration is almost as remarkable as the wings. When put in a basket over night, in which were a number of small branches, the lizards so arranged themselves as to be for the most part invisible. When I raised the lid in the morning, I thought that several must have escaped. Scrutiny revealed them stretched and flattened and fitted along the branches, legs clinging about the twig, and 'wings' pressed downward, not extended, so that the lizard's form was blended with and molded into that of the branch. Even the long thin tail was extended along the branch and not allowed to hang down. Their color blends perfectly with that of the bark. When annoyed, they are slow to move, as if realizing that their 'low visibility' is their best protection." (C. H. P.)

Acanthosaura hainanensis Boulenger

Acanthosaura hainanensis Boulenger, 1899, Proc. Zoöl. Soc. London, p. 957, Pl. lxvi, fig. 2.

Fifteen specimens, A. M. N. H. Nos. 30875–30889, were collected in the mountains south of Nodoa and brought to Mr. Pope in July, 1923.

These agree with Boulenger's figure and description. *Acanthosaura crucigera*, with which Boulenger compared this species in the original description, is not available to me, but the Hainan series shows an astonishing agreement in color pattern with *A. lamnidentata*. From the latter species they differ in the flat, smooth, dorsal and lateral scales, the intermixed larger ones being flat and keeled, while both large and small scales in *lamnidentata* are tubercular. In *hainanensis* the upper head scales are flat with a single keel, while in *lamnidentata* they are many-keeled or rugose.

The upper labials range from eleven to thirteen, the canthals and supraciliaries from ten to twelve.

The measurements of ten male specimens are as follows:

	Extremes	Average
Total Length	197-252 mm.	225 mm.
Body	71- 88	80
Tail	129-164	145
Arm	44- 52	47
Leg	67- 79	73

"About the first of July I hired Li Ah-Sen and sent him into the Loi Country, into the high mountains to the south. He returned on the 5th with two specimens of *Acanthosaura hainanensis*. These lizards were brilliant green in life with a jet-black head. It is evidently a mountain form, as we have not bought a single specimen." (C. H. P.)

Calotes versicolor (Daudin)

Agama versicolor Daudin, 1803, 'Hist. Nat. Rep.,' III, p. 395, Pl. xliv.

Calotes versicolor Fitzinger, 1826, 'Neue Class. Rept.,' p. 49. Swinhoe, 1870, Proc. Zoöl. Soc. London, p. 240. Boulenger, 1885, 'Cat. Lizards Brit. Mus.,' I, p. 331. Bœttger, 1888, Ber. Offenbacher. Ver. Naturk, XXVI–XXVIII, p. 61; 1894, Ber. Senck. Ges., p. 131. Cope, 1895, Proc. Acad. Nat. Sci. Phila., (1894), p. 428. Boulenger, 1899, Proc. Zoöl. Soc. London, p. 957. Barbour, 1909, Proc. New England Zoöl. Club., IV, p. 62. Vogt, 1913, Sitzber. Ges. Naturf. Freunde Berlin, p. 225. Smith, 1923, Journ. Nat. Hist. Soc., Siam, VI, p. 199.

One hundred and five specimens, A. M. N. H. Nos. 30960–31064, of this species were collected at Nodoa.

Summary of Measurements and of Scales Around the Body

	Sex	No. of Specimens	Extremes	Average
Total Length	♂	41	162-435 mm.	323 mm.
	♀	53	153-405	274
Tail Length/Total Length	♂	41	.75–.78	.765
	♀	53	.75–.78	.764
Length of Hind Leg/BodyLength	♂	44	.74–.90	.82
	♀	61	.74–.90	.82
Scales Around Mid-body	♂	44	40– 46	43
	♀	61	40– 47	44

Comparison material for the study of geographic variation in this species is not at hand. It seems likely that it may prove to be divisible into geographic races in the area from Afghanistan to Ceylon and Hainan, which constitutes its range.

"This is the commonest of lizards, their numbers undiminished in the mission compound in spite of all that were collected for us. They are essentially bush or tree inhabitants, usually seen descending a palm or on the garden wall, never seen on the ground except when apparently en route to some support. They employ the common trick of arboreal animals of keeping the trunk of the tree between themselves and an approaching person.

"During the winter I saw no brightly colored *Calotes*, and had replied in the negative to Mr. Leverett's question as to whether we had secured a red-headed tree-lizard. On March seventeenth I came upon a *Calotes* with head, throat, and shoulders crimson, with a black spot on each cheek. Recalling Mr. Leverett's query, I eagerly grabbed this specimen. Before I recovered my balance, a glance showed me that I was holding a brown-shouldered and brown-headed lizard, with no black spots, and only a little pale crimson on the throat. I have never seen a more sudden or complete color change." (C. H. P.)

Leiolepis belli (Gray)

Uromastix belli Gray, 1827, Zoöl. Journ., III, p. 216.

Liolepis belli Cantor, 1847, 'Cat. Malay Rept.,' p. 41. Boulenger, 1885, 'Cat. Lizards Brit. Mus.,' I, p. 403. Bœttger, 1893, 'Kat. Rept. Mus. Senck.,' I, p. 55.

Liolepis guttatus Swinhoe, 1870, Proc. Zoöl. Soc. London, p. 240.

Liolepis reevesii Stanley, 1914, Journ. N. China Branch Roy. Asiatic Soc., XLV, p. 25.

Two hundred and ten specimens of this species, A. M. N. H. Nos. 30666–30874, 30959, were secured in the neighborhood of Nodoa.

The males of this species are characterized by their larger size and brilliant coloration. Juvenile specimens have three longitudinal, dorsal, light lines, which become broken up by the reticulate pattern between them with the growth of the individual.

Three to five of the subdigital lamellæ at the base of the third toe are strongly modified, suggesting the "comb" of *Cyclura* and the allied iguanid genera. So well defined a structure would be expected to have some definite function, the discovery of which must wait observations on this species in life.

The well-defined lateral fold at the base of the abdomen, whose edge is stiffened by prolongations of the posterior ribs, is a distinctive characteristic which also awaits investigation from a student of the living animal. It seems possible that it may be an adaptation for burying the body in sand, like the broadening of the bodies of numerous desert-inhabiting lizards, and the adult pattern strongly suggests that of other sand-loving lizards. I quote the curious account of Swinhoe as to the function of this lateral expansion, as, although it seems a rather fanciful one, it may help to focus the attention of some observer on this point. Swinhoe's observations, at the least, require verification. Part of his account follows:

> They lay basking in the sun, and when disturbed would run with great speed to the mouths of their holes, where they would stop short and turn their heads about. If not satisfied with what they saw, they popped at once into their holes. If surprised far from their holes, they spring into the air while running, and, expanding the loose red skin of their sides, skim along the surface of the sand for a considerable distance (say, often twenty yards at a time) and thus reach their retreats at greater speed. Their flight is not continued by flaps, but seems to be merely a long sustained leap, the body being made buoyant by the expanded side skin, and is analogous to the flight of the Flying-fish.

Variation in the labial scales, which appears to be independent of age and sex, is as follows:

NUMBER OF UPPER LABIALS	NUMBER OF COUNTS
6	2
7	25
8	183
9	183
10	27

Variation in the number of femoral pores also seems to be unexpectedly independent of age and sex:

NUMBER OF FEMORAL PORES	NUMBER OF COUNTS		
	♂	♀	juv.
12	3	3	2
13	52	16	24
14	82	29	54
15	61	29	31
16	12	12	5
17	2	1	2

Summary of Measurements

	Sex	No. of Specimens	Extremes	Average
Total Length	♂	87	236-438 mm.	340 mm.
	♀	40	197-320	263
	Juv.	58	155-234	193
Ratio of Tail Length to Total Length	♂	87	.64-.70	.666
	♀	40	.64-.70	.680
	Juv.	58	.67-.70	.686
Ratio of Leg Length to Body Length	♂	106	.61-.72	.661
	♀	45	.62-.74	.678
	Juv.	59	.65-.77	.718

"These lizards, whose local name is 'Pore-lung,' were uncommon until the first of March, when they began to appear in numbers. They are exceedingly abundant in the open rolling country, with sparse vegetation, about Nodoa.

"The Pore-lung is a swift runner, but takes refuge in his hole sooner or later, if pursued. A healthy rat-terrier gave chase to one and the lizard kept well in the lead for about 100 feet. Then he stopped short, and the terrier, after running past, came back and caught him.

"Their holes may be at the very edge of a well-frequented path. In general, the holes are inconspicuous and are concealed in the short grass. There is no mound at the opening, which is variable in shape, about an inch by an inch and a half. The holes extend for about two feet and at such an angle as to reach a depth of about one foot. They enlarge slightly below the ground. None were straight. Each hole was inhabited by a single lizard." (C. H. P.)

Varanidæ

Varanus salvator (Laurenti)

Stellio salvator Laurenti, 1768, 'Syn. Rept.,' p. 56.
Varanus salvator Cantor, 1847, 'Cat. Malay Rept.,' p. 29.
Varanus dracæna Swinhoe, 1870, Proc. Zoöl. Soc. London, p. 239.

Five *Varanus*, A. M. N. H. Nos. 31513–31517, were collected at Nodoa by Mr. Clifford H. Pope.

These agree excellently with Boulenger's description of *Varanus salvator* in every important character. Hainan and southern China represent the northeastern extreme of the range of this species.

In this series, the enlarged supraoculars are usually seven, eight occurring twice. The number of dorsal scales in a length equal to that of the occipital from the tip of the snout ranges from twenty-six to thirty, nuchals in an equal length, counting from the posterior border of the skull, from twenty-four to twenty-eight. The scales between the occipital and the 'rostral' range from twenty-five to thirty. The transverse rows of ventrals, counted from the groin to the gular fold, number from eighty to ninety-three; the ventrals in a transverse row range from sixty-five to seventy-five. There is a distinct median groove on the snout.

"My hunter talks of monitors twelve feet long, but produces no evidence. The specimens secured came from Nam Fong, so it probably comes from the mountains south of that market.

"The first monitors brought in were very docile, and at most made half-hearted attempts to bite and to lash with their tails, with an occasional hiss. A female monitor, after egg-laying, became much more lively. When approached she raised herself on all fours, blew out her throat, hissed, and lashed with her tail. Her tail was a very effective whip, and was used like one; the little fox-terrier in the compound promptly learned to give her a wide berth. She was both deliberate and accurate with her blows.

"The ten eggs laid by this specimen were perfectly white, with a leathery shell. Their measurements range from 39×75 mm. to 41 × 80 mm. The egg-laying began on July 8th and was not completed until July 13th." (C. H. P.)

Lacertidæ

Takydromus sexlineatus meridionalis (Günther)

Tachydromus meridionalis Günther, 1864, 'Rep. Brit. India,' p. 70, Pl. viii, fig. D.

Takydromus sexlineatus Smith, 1923, Journ. Nat. Hist. Soc. Siam., VI, p. 200.

Two hundred and fourteen specimens of this form, A. M. N. H. Nos. 30452–30665, are in the Hainan collection.

This subspecies differs from *T. sexlineatus sexlineatus* in having twelve or more longitudinal rows of ventrals and never more than one femoral pore on each side.

The number of longitudinal rows of ventrals varies as follows:

	♂	♀
12 Rows	73 specimens	77 specimens
14 Rows	25 specimens	36 specimens
16 Rows	....	1 specimen

Six specimens have more than the normal four rows of enlarged dorsals, two having five and four six. The frontonasal and rostral are in contact in sixty-three specimens, separated in one hundred and fifty. One specimen has a small median scale between the supranasals. One specimen has gulars 3–2 and one 4–3, otherwise there are uniformly three on each side.

These lizards are very badly infested with mites, which usually attach themselves beneath the ventral scales. Sixty-five is the maximum number found on a single specimen.

Summary of Measurements and Scale Characters

	Sex	No of Specimens	Extremes	Average
Ventrals from Anal Plate to Collar	♂	98	20- 26	23
	♀	114	23- 28	25
Lamellæ beneath 4th Toe	♂	97	17- 24	..
	♀	114	17- 25	..
Length Hind Leg/ Body Length	♂	98	.44-.52	.49
	♀	114	.38-.49	.44
Total Length	♂	27	180-240 mm.	212 mm.
	♀	16	166-224 mm.	205 mm.
Tail Length/Total Length	♂	27	.76-.81	.79
	♀	16	.76-.80	.79

"I have not seen a single specimen outside! A remarkable illustration of the possibility of missing an extremely common form entirely.[1] The natives began to bring them in in numbers about mid-April.

"One of these lizards laid five eggs in the laboratory on April 21st. The eggs are oval, nine to ten mm. in length, with a leathery shell." (C. H. P.)

Scincidæ

Mabuya multifasciata (Kuhl)

Scincus multifasciatus Kuhl, 1820, Beiträge Zool. Vergl. Anat., p. 126.

Mabuya multifasciata Fitzinger, 1826, 'Neue Class. Rept.,' p. 52. Smith, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 200.

Mabuia multifasciata Bœttger, 1894, Ber. Senck. Ges., p. 131.

Forty-eight specimens of this species, A. M. N. H. Nos. 30250–30297, were collected at Nodoa.

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[1] It seems likely that this lizard inhabits bunch grass, and that both body form and coloration are highly 'protective,' as I have myself observed in long tailed anoles with a similar habitat (Cf. Schmidt, 1921, Bull. Amer. Mus. Nat. Hist., XLIV, p. 11).

This proves to be a species with a small range of variability. The dorsal scales are nearly always tricarinate. Adult females may be distinguished by the white spots on the sides. All but three have six supraciliaries on each side, two having six on one side and five on the other, and one five on one side and four on the other. A single specimen has six upper labials on one side, seven being normal. The subdigital lamellæ beneath the fourth toe range from seventeen to twenty-one.

Female specimens are strongly spotted on the sides, each spot a white shaft confined to a single scale. The reproduced tail has transversely enlarged dorsal and ventral scales.

The maximum body length for the present series is 118 mm., in a female specimen with reproduced tail. The measurements of the largest specimen (male; A. M. N. H. No. 30286) with a complete tail are as follows:

Total Length	310 mm.
Tail Length	204
Length of Arm	35
Length of Leg	48

Summary of Measurements and Scale Characters

	Sex	No. of Specimens	Extremes	Average
Scales around Mid-body	♂	21	28- 31	30.0
	♀	20	29- 32	30.3
Dorsals in a Longitudinal Row[1]	♂	21	40- 45	43
	♀	20	41- 46	43
Ventrals from Anus to Mental	♂	21	48- 55	52
	♀	20	48- 56	53
Ratio of Leg Length to Body Length	♂	21	.41-.48	.45
	♀	20	.40-.47	.42
Ratio of Tail Length to Total Length	♂	4	.64-.66	.65
	♀	3	.63-.64	.64

"This skink is to be seen everywhere in open bushy or grassy country and in thickets. It seems, however, to have a decided preference for the vegetation along streams. There it may be seen in the daytime walking about under the low growth. They draw themselves over the leaves, stopping frequently to look around. As soon as alarmed, off they go like a flash. When caught, they seem half stupified, but give one a good nip now and then. I have seen them in the mission garden, but they keep within reach of shelter and do not venture on the open lawn." (C. H. P.)

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[1] Counted from a point opposite the anal cleft to the parietals.

Sphenomorphus leveretti,[1] new species

Figure 10

Type.—A. M. N. H. No. 30201; ♂; Mountains south of Nodoa, Hainan; July 1923; Clifford H. Pope.

Diagnosis.—Allied to *Sphenomorphus indicus*, from which it may be distinguished by its more elongate snout; the longer and more pointed frontal; the much greater extension of the rostral shield on the upper surface of the snout; the longer dorsal and nuchal scales; twenty-two compressed lamellæ beneath the fourth toe; and a more spotted dorsal pattern, the lateral black band of *indicus* being represented only by numerous black spots, while the mid-dorsal area is heavily spotted with black, without the median black line occasionally found in *indicus*.

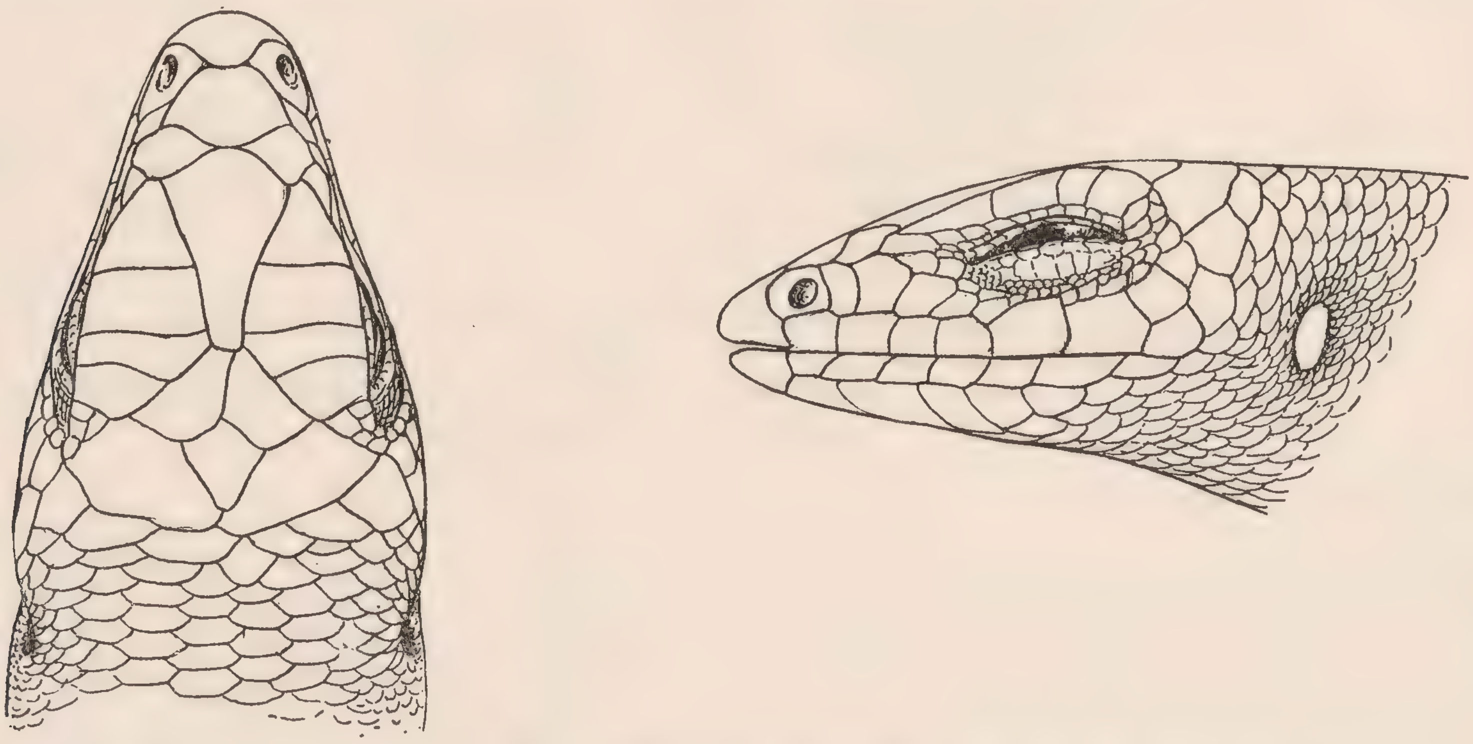

Fig. 10. *Sphenomorphus leveretti*, new species, A. M. N. H. No. 30201. Head from above and from side, × 2.

Description of Type.—Rostral with a broad superior portion, about equal to two-thirds of the fronto-nasal, with which it makes a broad suture; no supranasals; nostril in a large nasal, which is bounded by the first labial, loreal, frontonasal, and rostral; anterior loreal little higher than the second, about two-thirds as long; seven upper labials, the fifth beneath the eye, fifth or sixth largest; frontonasal a little broader than long, in contact with the frontal; prefrontals moderate; frontal elongate, in contact with three supraoculars; four supraoculars; ten or eleven supraciliaries; lower eyelid with a semitransparent disc, which is composed of vertically elongate plates; fronto-parietals much larger than the interparietal; interparietal a little longer than wide; parietals in contact behind the interparietal; a row of five slightly enlarged nuchals bordering the parietals; temporals three in the first row, two in the second; ear opening oval, without lobules; a single large post-mental;

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[1] Named for Reverend Wm. J. Leverett, of the American Presbyterian Mission, Nodoa, Hainan.

dorsal scales smooth, with faint striæ; four enlarged preanals, of which the middle pair is much the largest; thirty-seven scales around the middle of the body; no enlarged subcaudals; fingers and toes with smooth subdigital lamellæ, those of the toes strongly compressed, but not truly keeled, twenty-one and twenty-three under the fourth toes; sixty-four scales in a dorsal row from a point opposite the rear face of the thighs to the parietals.

Upper parts dark brown, with a metallic green sheen, with scattered black spots; sides heavily spotted with black; venter immaculate gray; a light line extends from the loreal beneath the eye to the ear, and continues as a less distinct one to the arm; limbs with light spots, (or a dark net work) above; head shields, especially prefrontals, frontal, supraoculars and labials, with black spots.

Measurements of Type and Paratypes

A. M. N. H. No.	30201 Type ♂	30200 ♂	30202 ♀
Total Length	243 mm.	243 mm.	....
Length of Body	86	87	97 mm.
Length of Tail	157	156	....
Snout to Axilla	35	36	36
Axilla to Groin	47	47	58
Length of Arm	28	29	28
Length of Leg	43	45	40

The paratypes agree with the type excellently in coloration; the frontal is in contact with two supraoculars on one side and three on the other in all three; enlarged nuchals are scarcely distinguishable; the dorsal scales from base of tail to parietals range from sixty-six to sixty-eight; scales around the body range from thirty-six to thirty-eight; subdigital lamellæ beneath the fourth toe range from twenty-one to twenty-three.

Leiolopisma reevesii (Gray)

Tiliqua reevesii Gray, 1838, Ann. Nat. Hist., II, p. 292.

Hinulia reevesii Gray, 1845, 'Cat. Lizards,' p. 76.

Eumeces reevesii Günther, 1864, 'Rept. Brit. India,' p. 87, Pl. x, fig. k.

Lygosoma nigropunctatum Bocourt. 1878, Ann. Sci. Nat., (6) VII, Art. 16, p. 2. Mocquard, 1897, Bull. Mus. Hist. Nat. Paris, III, p. 213.

Lygosoma laterale (part) Boulenger, 1887, 'Cat. Lizards Brit. Mus.,' III, p. 264.

Lygosoma laterale Mell, 1922, Arch. Naturg., LXXXVIII, Abt. A., Heft 10, p. 114. Vogt, 1922, idem, p. 137.

Leiolopisma laterale (part) Stejneger, 1907, Bull. U. S. Nation. Mus., No. 58, p. 218.

Leiolopisma laterale Smith, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 200.

Forty-six specimens, A. M. N. H. Nos. 30204–30249, collected at Nodoa by Mr. Clifford H. Pope, are certainly referable to *Leiolopisma reevesii* Gray.

The Chinese lizards of this genus have been cited as a conspicuous instance of discontinuous distribution since their identification with *Leiolopisma laterale* of the southern United States, first suggested by Boulenger in 1887. Stejneger, in 1907, followed Boulenger in referring Riu Kiu Island specimens to *laterale*. Van Denburgh, in 1912, for the first time dealing with adequate series, found at least three recognizable forms, respectively in Formosa, Ishigakishima, and Tsushima. He, however, maintains their connection with *laterale* by writing them as subspecies, and he identifies the Tsushima form with *L. reevesii* Gray. This close association of a Chinese and a North American species is not especially improbable, in view of the striking number of reptilian genera which have a North American—East Asian distribution.

The large series of Chinese *Leiolopismas* now at hand, collected by Mr. Pope in Hainan and Hunan, and by Mr. Walter Granger in Szechwan, enable me to re-examine this question. Two conclusions seem evident: (1) that the south Chinese *Leiolopisma reevesii* is distinct from the central Chinese *L. modestum;* and (2) that neither *reevesii* nor *L. modestum* is conspecific with *L. laterale*, *L. modestum* being the more closely allied.

The Hainan specimens form a series remarkably uniform in habitus, scale characters, and coloration. These must unquestionably be referred to *L. reevesii* Gray.

Gray, in the 'Catalogue of Lizards,' mentions the color character which is most distinctive of the present series, namely the presence of white spots in the dark lateral band. Günther's (1864) figure of the head of the type shows the broad contact of the prefrontals, also a characteristic of the present series. Finally, Mell has shown that Reeves' material came from south China. It is to be regretted that no Canton specimens of *Leiolopisma* are at hand, but the extremely close agreement of the Hainan and Kwangtung faunas leaves no doubt in my mind that the Hainan series before me is authentic *Leiolopisma reevesii* Gray.

It is by no means easy to draw up an infallible distinction between this *reevesii* and the American *laterale* based exclusively on scale characters, though the higher average of scale rows around the body and the usual meeting of the prefrontals in *L. reevesii* are nearly constant. The coloration, however, seems to be notably distinctive; *reevesii* has much more yellow in its coloration, has the lateral dark bar broken with light spots or vermiculation, has scattered dark spots on the lower sides, and frequently has a dark mid-dorsal line. When the tail is complete, the lateral line extends to its tip.

The arrangement of the prefrontals in the series examined is as follows:

	BROADLY IN CONTACT	MEETING AT A POINT	SEPARATED
L. reevesii[1]	42	3	1
L. modestum	6	16	54
L. laterale	5	3	42

The scales around mid-body are thirty in seventeen specimens, thirty-one in one, thirty-two in seven, and thirty-three in one. In specimens of *L. laterale* examined by Van Denburgh and myself, this count ranges from twenty-six to thirty, the latter figure only once in twenty-eight specimens.

The number of lamellæ beneath the fourth toe in *L. reevesii* ranges from sixteen to nineteen, and this character is in close agreement in *L. laterale.*[2]

Summary of Measurements and Scale Characters

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Scales Around Mid-body	♂	18	30- 32	30.4
	♀	9	30- 33	31.2
Dorsal Scales in a Longitudinal Row	♂	18	66- 74	70
	♀	9	69- 76	73
Lamellæ Beneath the Fourth Toe	♂	18	16- 19	17.6
	♀	9	17- 19	17.8
Length of Body	♂	18	41- 48 mm.	46 mm.
	♀	9	47- 53	50
Ratio of Leg-length to Body-length	♂	18	.31-.37	.34
	♀	9	.28-.33	.31
Total Length	♂	10	123-136 mm.	131 mm.
	♀	4	133-136	135
Ratio of Tail-length to Total Length	♂	10	.63-.67	.65
	♀	4	.62-.64	.63

The number of dorsal scales from the posterior sides of the thighs to the parietals ranges from sixty-six to seventy-six in twenty-seven *reevesii,* averaging seventy-one compared with a range of from sixty-one to seventy-two and an average of sixty-eight, in twenty-eight *L. laterale.*

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[1] Smith records thirteen specimens, of which eight have the prefrontals in contact, four meeting in a point, and one separated.

[2] The specimen from Tsushima Island referred to *Leiolopisma laterale reevesii* by Van Denburgh appears to be amply distinguished from both *reevesii* and *modestum* by the small number of subdigital lamellæ beneath the fourth toe, twelve, compared with sixteen to nineteen in *reevesii.* For this specimen (Calif. Acad. Sci. No. 26134), I wish to propose the name **Leiolopisma vandenburghi**. It is an especial pleasure to attach the late Dr. Van Denburgh's name to this form, as he has led the way to an intelligible analysis of the oriental forms confounded with *L. laterale.*

L. reevesii is distinguished from *L. modestum* Günther, whose type locality is Ningpo, in part by the same characters which distinguish it from *L. laterale*. There is much more reason for a confusion of *L. modestum* with *laterale* than for the identification of *reevesii* with either. I shall return to this problem in a discussion of *L. modestum* in a subsequent paper of the present series.

"This is a very common little skink. I saw it most often in the late afternoon when it would run off the road ahead of me to rustle away in the grass. My collectors usually brought in four or five in a morning. There is a varying amount of red on the sides." (C. H. P.)

Lygosaurus salsburyi,[1] new species

Figure 11

Type.—A. M. N. H. No. 30198 ; ♂; Nodoa, Hainan, China; 1923; Clifford H. Pope.

Diagnosis.—Very clearly allied to *Lygosaurus sowerbyi* Stejneger, of Fukien, from which it may be distinguished by the greater number of subdigital lamellæ. In *salsburyi* there are from nineteen to twenty-one lamellæ beneath the fourth toe, compared with fifteen or sixteen in *sowerbyi*. In the present form the part of the frontal anterior to its constriction is about equal to the posterior part, while in *sowerbyi* the anterior part of the frontal is much shorter than the posterior portion.

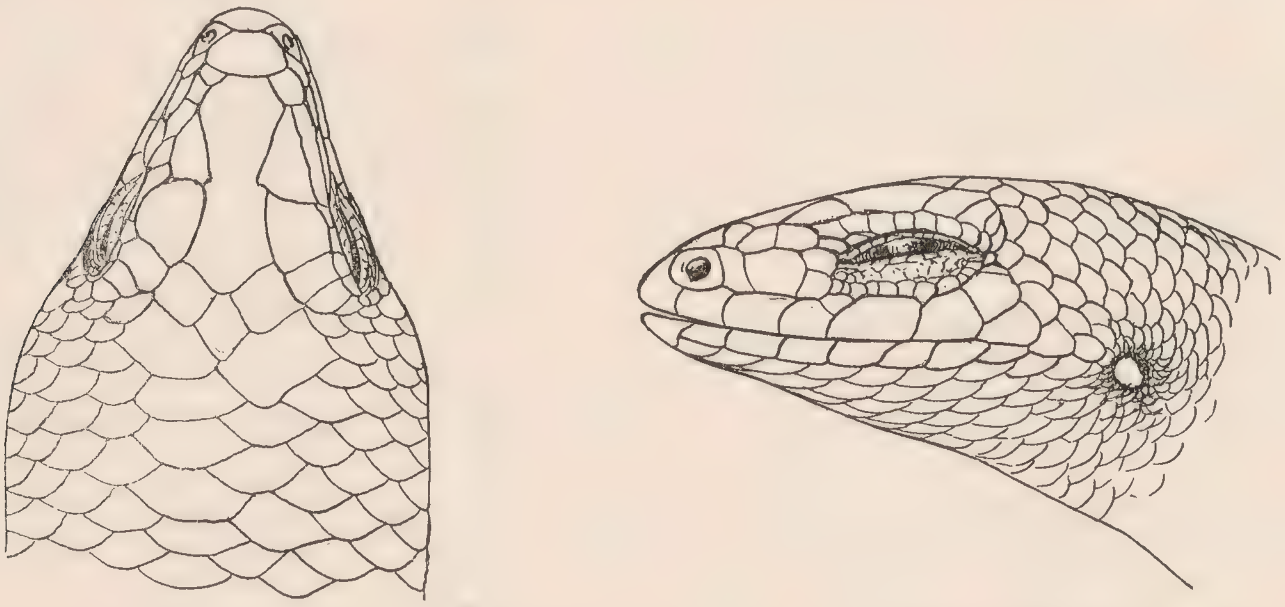

Fig. 11. *Lygosaurus salsburyi*, new species, A. M. N. H. No. 30199.
Head from above and from side, × 2.

Description of Type.—Habitus stout, with a moderately long conical tail, and short limbs, head not wider than the body, snout rather pointed, with sloping lores.

Rostral much broader than high; no supranasals; nostrils in rather large nasals; nasals in contact with the first labial, loreal, frontonasal, and rostral; two loreals, the first higher than broad, the second nearly square; six upper labials, fourth largest and beneath the eye; prefrontals small, widely separated, apparently continuous with the supraciliary series; frontal very large, more than twice as long as its greatest width, with a strong lateral notch made by the angle of the first supraocular; three large supraoculars followed by a pair of smaller ones; eight or nine supraciliaries; frontoparietals larger than the interparietal, which is in contact with the frontal; parietals small, with a considerable suture behind the interparietal; no enlarged nuchals; three temporals in each row, lower anterior largest; ear opening small, round, without lobules; dorsal scales with two distinct keels, between which a median faint one is frequently present, indistinct additional lateral keels less frequent, all rather faintly striate; twenty-eight scales around the middle of the body; no enlarged preanals; forty-five scales in a dorsal row from a point opposite the posterior face of the thighs to the parietals; nineteen and twenty-one subdigital lamellæ beneath the fourth toes; no enlarged scales beneath the tail.

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[1] Named for Dr. Clarence G. Salsbury of the American Presbyterian Mission, Nodoa, Hainan.

Dorsal ground color light brown, lighter on the sides and the venter light yellowish brown; sides heavily spotted with vertical black spots, each usually at the base of a scale, and with a more or less distinct light spot behind it; these spots unite to form a distinct black band from shoulder to ear, enclosing two or three light spots; temples, in front of the ear-openings, heavily spotted; a few sharply defined black spots at the sides of the chin and throat; mid-dorsal area posteriorly and on the tail with scattered longitudinal black shafts on the centers of scales; venter immaculate.

Measurements of Type and Paratype

A. M. N. H. No.	30198	30199
Total Length	171 mm.	....
Length of Body	80	87 mm.
Length of Tail	91	....
Snout to Axilla	30	31
Axilla to Groin	47	54
Length of Arm	16	17
Length of Leg	24	25

The single paratype agrees excellently with the type; one of its hind feet is lost and the tail is reproduced, with a short extra "nubbin" on one side. There are twenty-eight scales around the body; twenty subdigital lamellæ beneath the fourth toe; and forty-seven dorsal scales from the base of the tail to the parietals.

Eumeces quadrilineatus (Blyth)

Figure 12

Plestiodon quadrilineatum Blyth, 1853, Journ. Asiatic Soc. Bengal, XXII, p. 652.

Eumeces quadrilineatus Bocourt, 1879, 'Mission Sci. Mex.,' Rept., p. 423, Pl. xxii, *D*, fig. 5. Boulenger, 1887, 'Cat. Lizards Brit. Mus.,' III, p. 381.

A single specimen of this species, A. M. N. H. No. 30197, ♂, was collected in the mountains south of Nodoa, July 30th, 1923, by a Loi collector for the expedition.

This form has not hitherto been recorded from Hainan. I append a description of the present specimen (A. M. N. H. No. 30197).

Habitus slender; head slightly swollen at the temples; tail stout, incomplete.

Supranasals in contact behind the rostral; nostril large, in the center of a single nasal; a postnasal nearly or quite as long as the first loreal; frontonasal broader than long, not in contact with rostral or frontal; prefrontals nearly as large as the frontonasal, in contact; anterior loreal higher than the second, about one-third as long; seven or eight upper labials, fifth or sixth beneath the eye, last largest; mental followed by two postmentals; frontal six-sided, the lateral sides nearly parallel, its length about equal to its distance from the end of the snout, in contact with the anterior three supraoculars; four supraoculars; eight supraciliaries; frontoparietals about equal to the interparietal, somewhat larger than the prefrontals; parietals meeting behind the interparietal; three pairs of nuchals; two temporals in the first row, lower the larger; lower temporal of the second row little larger than the upper, wedge-shaped; two or three small lobules on the anterior border of the ear; soles of the hind feet with two series of enlarged tubercles, which extent from the heel to the bases of the third and fourth toes; twenty scales around the middle of the body; eighteen lamellæ beneath the fourth toe; fifty-two dorsal scales from a point opposite the rear face of the thighs to the parietals.

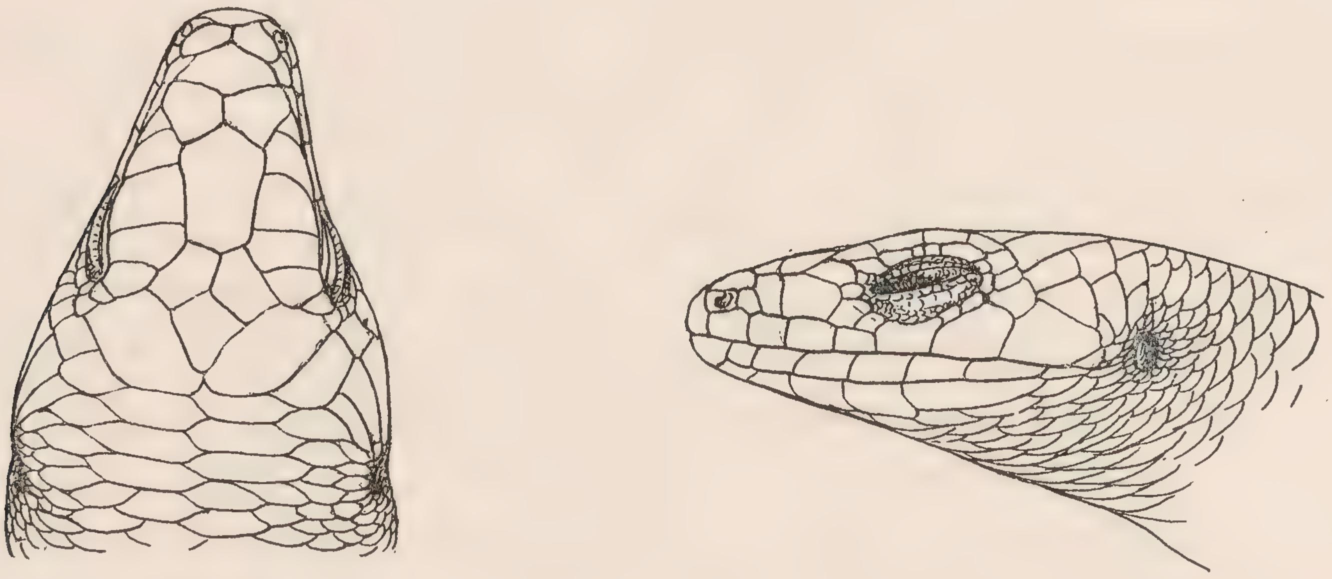

Fig. 12. *Eumeces quadrilineatus* Blyth, A. M. N. H. No. 30197.
Head from above and from side, × 2

Back very dark gray; head slightly brownish, venter light gray, yellowish gray beneath throat and tail; a pair of light dorsolateral lines extends from the parietals on the middle of the second scale row from the mid-dorsal line to the base of the tail, and these continue on the tail as broader lines, involving the outer part of the median two scale rows.

Measurements

Length of Body	72 mm.
Snout to Axilla	26
Axilla to Groin	44
Length of Arm	22
Length of Leg	28

SERPENTES

Typhlopidæ

Typhlops braminus (Daudin)

Eryx braminus DAUDIN, 1803, 'Hist. Nat. Rept.,' VII, p. 279.

Typhlops braminus CUVIER, 1829, 'Regne Anim.,' 2nd Ed., II, p. 73. BŒTTGER, 1888, Ber. Offenbacher Ver. Naturk., XXVI–XXVIII, p. 70; 1894, Ber. Senck. Ges., p. 132; 1898, 'Kat. Rept. Mus. Senck.,' II, p. 1. STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 260, figs. 232–235. SMITH, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 200.

A series of thirty-seven specimens of this species was collected at Nodoa (A. M. N. H. Nos. 28108–28144). They offer no appreciable variation from mainland specimens, or from published descriptions of this form. They range in length from 87 to 150 mm., and in diameter from 2.3 to 4 mm. The ratio of length to diameter varies from 34 to 48, the average being 41. The average length is 124 mm.

"This tiny snake is extremely abundant. An eight-year-old boy collected them for me during the spring by looking every week or so under the few dozen flower pots in the yards of the foreign houses. My Chinese servant swept one up in the yard." (C. H. P.)

Boidæ

Python bivittatus Schlegel

Python bivittatus SCHLEGEL, 1837, 'Phys. Serp.,' III, p. 403, Pl. xv, figs. 1–4. WERNER, 1921, Arch. Naturg., LXXXVII, Abt. A, Heft 7, p. 240.

Python molurus SWINHOE, 1870, Proc. Zoöl. Soc. London, p. 241. BOULENGER, 1893, 'Cat. Snakes Brit. Mus.,' I, p. 418 (part). BŒTTGER, 1894, Ber. Senck. Ges., p. 132.

Seven specimens of this species were secured by Mr. Pope at Nodoa, A. M. N. H. Nos. 27804–27810.

In the uniform presence of suboculars the present series bears out Werner's distinction of *bivittatus* from *molurus*.

The specimens range in length from 2235 to 3353 mm. (skins). The tail-length ranges from .11 to .14 of the total. The dorsal scales, on the neck, at mid-body, and just before the vent, range from 54–65–40 to 62–72–44. The ventrals range in number from 255 to 262, average 258, and the subcaudals from 65 to 71, average 68. The upper labials are 12–12[1] in four specimens, 12–11 in two, and 11–11 in one. The lower labials vary from 18 to 20. The oculars, which encircle the eye, are 7–7 in four specimens, 6–7 in one, and 8–6 in one. The color pattern is apparently typical.

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[1] The two figures separated by a dash refer to the left and right sides of the specimen.

Swinhoe's remarks on this species are interesting. He says:

> Two large Pythons were exposed in the market for sale at Taipingsze (Central Hainan) in February. They had been taken in the neighborhood, and I was told that the country people often brought them in. They were confined merely by a straw rope twisted around the neck. The natives declare that they are not hurtful to man and are easily caught by throwing over their heads a noose of twisted grass, and may with this be led about without danger. They call them Vang, and take them for the sake of their skin, heart, and liver. The skin is used chiefly for making drums, banjos, and other musical instruments, and the heart and liver, when dried and pounded, for stimulative medicine."

"A nine-foot python proved to be easily managed and could be handled freely. Teasing caused it to try to bite once or twice, but only at very close range. This specimen climbed a banyan tree and lay out upon the small limbs at the very top, so that we had to shoot the limb off to get it down. Its movements were slow and deliberate. A smaller specimen, six and a half feet long, was more agile in climbing and bit more viciously. Beyond a very slight tightening of the coils, neither of these snakes could be induced to constrict my forearm. Pythons seemed to be fairly common near Nodoa and apparently were not confined to any special habitat. We were told by the farmers that their dogs were responsible for the discovery of pythons." (C. H. P.)

Colubridæ

Sibynophis hainanensis, new species[1]

Figure 13

TYPE.—A. M. N. H. No. R27788, ♂; Nodoa, Hainan, China; December 1922–July 1923; Clifford H. Pope.

DIAGNOSIS.—Closely allied to *Sibynophis collaris;* maxillary teeth 40; rostral just visible from above; upper labials 8; parietal in contact with the lower postocular; ventral plates 167, caudals 115.

DESCRIPTION OF TYPE.—Habitus of *S. collaris;* head moderately distinct from the body, body moderately slender, nearly cylindrical; tail long.

Maxillary teeth 40.

Rostral twice as broad as high, narrowly visible from above; internasals shorter than the prefrontals, but the internasal suture nearly equal to that of the prefrontals; nasal completely divided; loreal about as long as high; frontal longer than its distance from the end of the snout, much shorter than the parietals; one preocular and two postoculars; temporals 2–2 on each side; upper labials 8, the 3rd, 4th and 5th entering the eye on the right side, only the 4th and 5th on the left, a small anterior subocular being cut off from the third labial on that side; lower labials 10.

Dorsal scales all smooth, in 17 rows the whole length of the body, without apical pits; ventral plates 167; subcaudals 115; anal divided.

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[1] Schmidt, 1925, Amer. Mus. Novitates, No. 157, p. 2.

General color light grayish brown; a faint dark mid-dorsal line anteriorly; head and neck dark brown with three black crossbands, the first two obscure, the first on the posterior part of the supraoculars and the frontal; the second on the posterior part of the parietals; the third a broad nuchal colar, outlined posteriorly by a narrow white line; a sharply defined white line on the upper labials, outlined above by the brown head color, below by a narrow border of black; this light line extends from the nostril to the angle of the mouth, and is connected with its fellow by a line across the rostral; labial border white; venter white, each ventral plate with a pair of black dots at each end, which become confluent into continuous black lines posteriorly; chin with black dots; mental and first three lower labials each with a white spot outlined with brown.

Total length 483 mm., tail 177 mm., tail length .37 of the total.

Range.—Known only from Hainan.

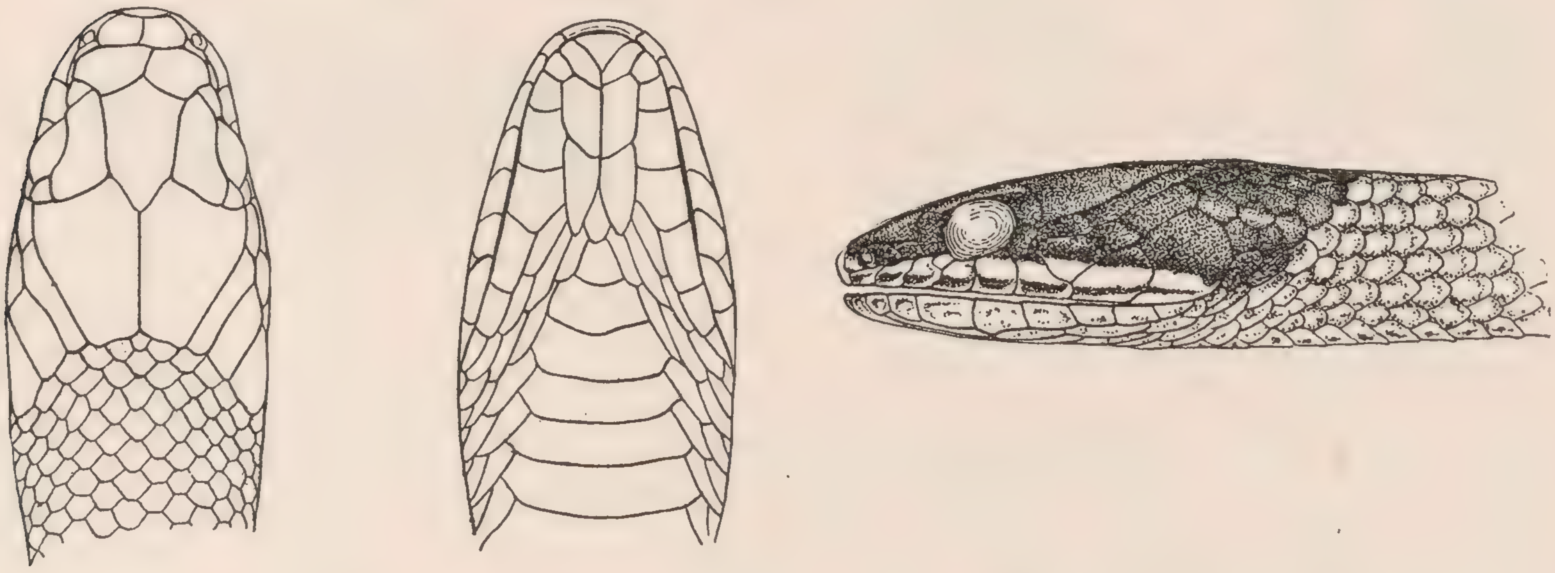

Fig. 13. *Sibynophis hainanensis*, new species, A. M. N. H. No. 27788, type. Dorsal, ventral, and lateral views of head, × 2.

If compared with Boulenger's synopsis of this genus (1893, p. 181), this Hainan form seems well distinguished from its nearest ally, *Sibynophis collaris*. Boulenger has since described *S. grahami* from Yunnan, and this approaches the present form in having only eight upper labials. It differs, however, in coloration, and has a much lower number of subcaudals (83), so that it can only be associated with the present form through *collaris*. Boulenger's reference of *Sibynophis sinensis* Günther, described from Ichang, Hupeh, to *collaris* is not convincing, and I am inclined to the opinion that *collaris*, *sinensis*, *grahami*, and *hainanensis* may prove to be rather intimately related subspecies of a single widespread form.[1]

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[1] See Werner, 1926, p. 142.

Natrix popei, new species[1]

Figure 14

Type.—A. M. N. H. No. 27763, ♂; Nodoa, Hainan, China; December 1922–July 1923; Clifford H. Pope.

Diagnosis.—Closely allied to *Natrix vibakari* and to *Natrix sauteri* of Formosa; maxillary teeth 20, the last gradually enlarged; anal divided; scales in nineteen rows; one or two anterior temporals; eight upper labials, fourth and fifth entering the eye; ventral plates 130–137; subcaudals 78–86; apical pits very faint, small, absent on most scales.

Description of Type.—Size small, head moderately distinct from body, tail long.

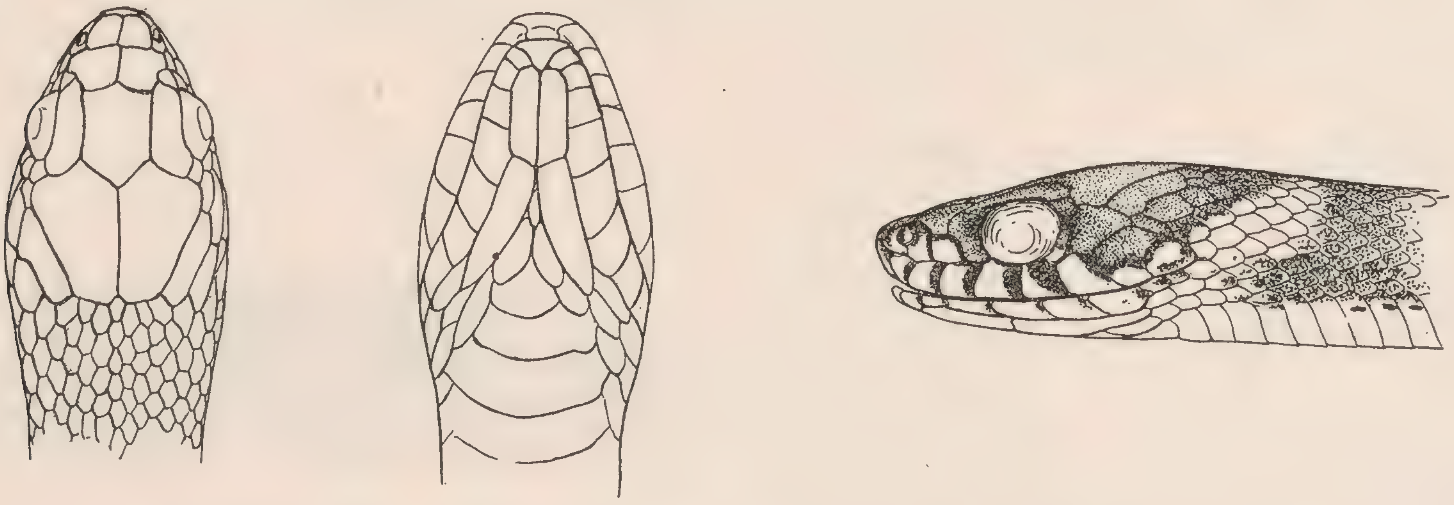

Fig. 14. *Natrix popei*, new species, A. M. N. H. No. 27763.
Dorsal, ventral, and lateral views of head, × 2.

Maxillary teeth 20, gradually enlarged posteriorly.

Rostral vertical, only its edge visible from above, wider than high, its suture with the internasal about equal to that with the first labial; internasal suture about two-thirds as long as that of the prefrontals; nasal divided, nostril lateral; loreal nearly quadrangular, a little longer than high; one preocular and three postoculars; temporals 2–2 on each side, the upper anterior small; upper labials 8, the fourth and fifth entering the eye; lower labials 9, four in contact with the anterior chin-shields, which are shorter than the posterior; first pair of lower labials separated by the triangular mental.

Dorsal scales distinctly keeled, the outermost row smooth, in 19–17 rows; apical pits absent on most scales, occasionally present, but small and faint; ventral plates 133, subcaudals 78; anal divided.

General dorsal color dark brownish gray, lightest in two dorsolateral bands, in which are situated, on each side, a row of white, vertical, dark-edged spots, extending to about mid-body, absent posteriorly; venter white, a row of black spots on each side, one on each ventral, larger posteriorly and confluent into black latero-ventral lines; ventrals outside of these spots clouded with the dorsal color; each side of the neck with a broad light mark, the two nearly united dorsally; top of head, and lateral scales, with fine vermiculations or punctulations of white spots; a characteristic labial pattern of the *vibakari* type (compare Stejneger, 1907, fig. 240); first six labials white with black posterior edges; seventh white at the labial border, dark above, edged with black; eighth with a flask-shaped white spot which reaches the labial border at the anterior corner; lower labials with narrow black marks on their sutures; loreal light, with dark margins.

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[1] Schmidt, 1925, Amer. Mus. Novitates. No. 157, p. 3.

Total length 356 mm., tail 107 mm., ratio of tail length to total, .30.

NOTES ON PARATYPES.—The paratypes (A. M. N. H. No. 27764, ♂, and 27765–68, ♀), agree excellently with the type. The first lower labials are in contact behind the mental in all; the dorsal scales are uniformly 19–17; the ventrals vary from 130 to 137, not differing in number in the sexes; subcaudals range from 78 to 86 in three specimens; labials and oculars are uniform with the type; temporals are 1–1 on both sides in three specimens, 2–1 in one, and 2–2 in one; maximum length 380 mm., tail length .29 to .32 of the total in three specimens; in three specimens the eighth labial spot is isolated, and fails to reach the labial border.

RANGE.—Known only from Hainan.

This species appears to be excellently distinguished from the Formosan *Natrix sauteri* by the higher number of ventrals, nineteen rows of dorsal scales instead of seventeen, and eight upper labials instead of seven. The coloration appears to be in close agreement, so far as can be judged from the description, and it is apparently very similar to that of juvenile *vibakari*, with which I believe both of these species to be allied. It is remarkable that the Hainan species proves to be more nearly allied to *vibakari* than the Formosan *sauteri*. The specimen of *vibakari* from Formosa referred to by Boulenger (1893, p. 222) is doubtless a *Natrix sauteri*. Mell (1922, p. 115) records *vibakari* from Kwangtung, without giving the characters of his specimens. These may prove to belong to the Hainan species.

Natrix piscator (Schneider)

Hydrus piscator SCHNEIDER, 1799, 'Hist. Amphib.,' I, p. 247.

Natrix piscator MERREM, 1820, 'Syst. Amphib.,' p. 122. STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 288, Figs. 250–252. BARBOUR, 1912, Mem. Mus. Com. Zoöl., XLIV, p. 109. SMITH, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 201.

Tropidonotus quincunciatus BŒTTGER, 1888, Ber. Offenbacher Ver. Naturk., XXVI–XXVIII, p. 76.

Tropidonotus piscator BŒTTGER, 1894, Ber. Senck. Ges., p. 132; 1898, 'Kat. Rept. Mus. Senck.,' II, p. 22. WALL, 1903, Proc. Zoöl. Soc. London, p. 86.

One hundred and ten specimens of this widespread species attest its abundance in Hainan (A. M. N. H. Nos. 28145–28254).

This species is, upon the whole, very uniform and fixed in its characters. The present series of specimens agrees in coloration with Boulenger's series B (1893, p. 232). The supralabials in the whole series vary from 9 in only four specimens, one of which has 8 on both sides, and the other three 8 on one side and 9 on the other. The lower labials are more variable, usually 10, but the formula 9–10 occurs in seventeen specimens, 9–9 four times, 8–9 once, 10–8 once, and 10–11 twice. The preocular is single except in one specimen, in which it is divided on one side. The postoculars are 2–2 in one specimen, 2–3 in one, 3–3 in seventy-eight, 3–4 in seventeen, 4 in eleven, 3–5 in one, and 4–5 in one. The first row of temporals is 1–1 in one specimen, 1–2 in two, 2–3 in one, and 2–2 in the remaining. In the second row there are 2–3 in seven, 3–3 in one, and 2–2 in the rest. The dorsal scales are normally 19–17, 19–17–15 occurring in ten specimens, 19–17–16 in six, 18–19–16 in one, and 17–18–15 in one.

The maximum length in the sixty-seven males is 668 mm., in the forty-three females 975 mm.

Summary of Ventrals, Caudals and Proportionate Tail-Length

	Sex	No. of Specimens	Extremes	Average
Ventral Plates	♂	67	122-133	126.5
	♀	43	134–145	138.2
Subcaudals	♂	51	73– 88	81.5
	♀	34	64– 77	71.5
Tail-Length	♂	51	.29–.33	.31
	♀	34	.23–.28	.24

Twelve stomachs contained remains of frogs, one the remains of a fish.

"This is perhaps the most abundant snake about Nodoa. It is found in all sorts of situations, but occurs in greatest numbers in wet, grassy places. It is especially abundant along the tiny streams just to the north of Nodoa.

"I frequently saw one that lived near a small pool in the corner of a rice field. It dashed into a hole in the clay bank whenever I appeared. One was taken in the mission compound.

"Some individuals have a row of red spots along either side, and these are apparently much less numerous than those without such spots." (C. H. P.)

Natrix stolata (Linnæus)

Coluber stolatus Linnæus, 1758, 'Syst. Nat.,' 10th Ed., I, p. 219.

Natrix stolatus Merrem, 1820, 'Syst. Amphib.,' p. 123. Stejneger, 1907, Bull. U. S. Nation. Mus., No. 58, p. 280, Figs. 244–246. Barbour, 1909, Proc. New England Zoöl. Club, IV, p. 67; 1912, Mem. Mus. Comp. Zoöl., XLIV, p. 110. Smith, 1923, Journ. Nat. Hist. Soc. Siam., VI, p. 201.

Tropidonotus stolatus Swinhoe, 1870, Proc. Zoöl. Soc. London, 1870, p. 214. Bœttger, 1888, Ber. Offenbacher Ver. Naturk., XXVI–XXVIII, p. 79. Boulenger, 1893, 'Cat. Snakes. Brit. Mus.,' I, p. 253. Bœttger, 1894, Ber. Senck. Ges., p. 132. Vogt, 1913, Sitzber. Ges. Naturf. Freunde Berlin, p. 225.

One hundred and seven specimens of *Natrix stolata*, A. M. N. H. Nos. 30001–30107, were collected in the vicinity of Nodoa, where it is evidently the most abundant terrestrial snake.

Like *Natrix piscator*, this species has a low range of variation in scale characters, and its color pattern is equally constant. The development of a lineate dorsal pattern in a terrestrial *Natrix* appears to be correlated with the Savannah habitat, paralleling the pattern-type of the North American *Thamnophis*.

The normal number of supralabials is eight, and this is departed from in only three specimens, in each of which the number is reduced to seven on one side. The lower labials are usually ten, eight occurring five times, nine seventeen times, and eleven six times, against ten in one hundred eighty-six counts. Two specimens have two preoculars on both sides, three have one on one side and two on the other, and the remaining series has the normal single preocular. The postoculars range from two to four, but are three on both sides in ninety-one specimens. The temporals are 1–1 on both sides in eleven specimens, 1–2 in fifty-eight, and 2–2 in five. The dorsal scale rows are 19–17 in all except one specimen which has the irregular formula 19–18–16.

The maximum length in thirty-eight males is 634 mm., in twenty-eight females it is 687 mm.

Summary of Ventrals, Subcaudals and Proportionate Tail-Length

	Sex	No. of Specimens	Extremes	Average
Ventrals	♂	55	143–156	149
	♀	52	148–158	152
Subcaudals	♂	38	69– 87	80
	♀	28	70– 86	77
Tail-Length	♂	38	.24–.28	.26
	♀	28	.23–.27	.25

Five stomachs contained remains of *Microhyla* sp., and five remains of *Rana limnocharis*.

"This snake rivals *Natrix piscator* in abundance. Several were taken in the mission compound. It does not seem to be a water-snake. The bright yellow throat is a conspicuous recognition character.

"It is a very harmless and mild-tempered snake, and free handling would not cause it to bite. When attempting to escape, it glides away under even very short grass.

"Eggs apparently ready to be deposited measured 11 mm. by 15 mm." (C. H. P.)

Natrix subminiata (Schlegel)

Tropidonotus subminiatus SCHLEGEL, 1837, 'Phys. Serp.,' II, p. 313. VOGT, 1913, Sitzber. Ges. Naturf. Freunde Berlin, p. 225. STANLEY, 1914, Journ. N. China Branch Roy. Asiatic Soc., XLV, p. 28.

Natrix subminiata BARBOUR, 1912, Mem. Mus. Comp. Zoöl., XLIV, p. 111.

Four specimens, A. M. N. H. Nos. 27759–27762, agreeing with the *subminiata* of southeastern Asia, were collected at Nodoa.

The dorsal scale count in the single male specimen is 17–19–17, ventrals 149, and the tail is incomplete. In the three female specimens the dorsal scales are 19–17, 19–17–19–17, and 18–19–16, ventrals 155, 155 and 150, subcaudals 69, 73 and 71, respectively. Upper labials uniformly eight, the third, fourth and fifth entering the eye. The lower labials are ten, nine on one side in one specimen. There is a single preocular on both sides in one specimen, while the remaining three each have one on one side and two on the other. The postoculars are uniformly three. The temporals are invariably 2 in the first row, 2–3 in the second row in one specimen, 3–3 in one and 3–4 in one.

The largest specimen measures 810 mm., and the tail-length in the three female specimens is .22 or .23 of the total.

Barbour, (1912, p. 111), calls attention to the rather notable variation in the number of ventrals in this species and to its correlation with distinct geographic areas. In Upper Burma and Yunnan it appears to be represented by a form (whose scale counts do not overlap those of the lowland species) which I have distinguished as *Natrix helleri*.[1] A number of puzzling problems remain to be solved before the relations of the Javan and mainland forms can be expressed satisfactorily by means of subspecific classification.

Natrix andrewsi,[2] new species[3]

Figure 15

TYPE.—A. M. N. H. No. 28255, ♂; mountains south of Nodoa, Hainan, China; July 30, 1923; Clifford H. Pope.

DIAGNOSIS.—Subgenus *Macropophis*[4] Boulenger. Maxillary teeth 37, uniform anteriorly, the last gradually enlarged; body very slender; eye large; all the scales strongly keeled, in nineteen rows; ventral plates 164, subcaudals 118; anal divided.

DESCRIPTION OF TYPE.—Body and neck slender, tail long, head distinct, the eye very large, its diameter equalling its distance from the rostral.

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[1] Amer. Mus. Novitates, No. 157, p. 3.

[2] Named for Mr. Roy Chapman Andrews, leader of the Third Asiatic Expedition.

[3] Schmidt, 1925, Amer. Mus. Novitates, No. 157, p. 2.

[4] The highly interesting assemblage of species now grouped under *Natrix* offers such interesting problems for a general revision that I have retained the present form in *Natrix*, although convinced that *Macropophis* merits recognition.

Rostral more than twice as broad as high, its suture with the first labial much less than that with the internasal; internasals and prefrontals quadrangular, the internasal suture about three-fourths as long as that of the prefrontals; nasal divided, nostril lateral; loreal nearly square on one side, trapezoidal on the other; one preocular and four postoculars on each side; temporals 2–3 on each side; nine upper labials, the fourth, fifth and sixth entering the eye; lower labials 9, five in contact with the first pair of chin-shields; both pairs of chin-shields very long, the second longest, in contact with the fifth and sixth labials and with the first ventral plate.

Dorsal scales in 19–17 rows, all strongly keeled, with faint apical pits some distance from the tip of the scale, which is notched; ventral plates 164; subcaudals 118; anal divided.

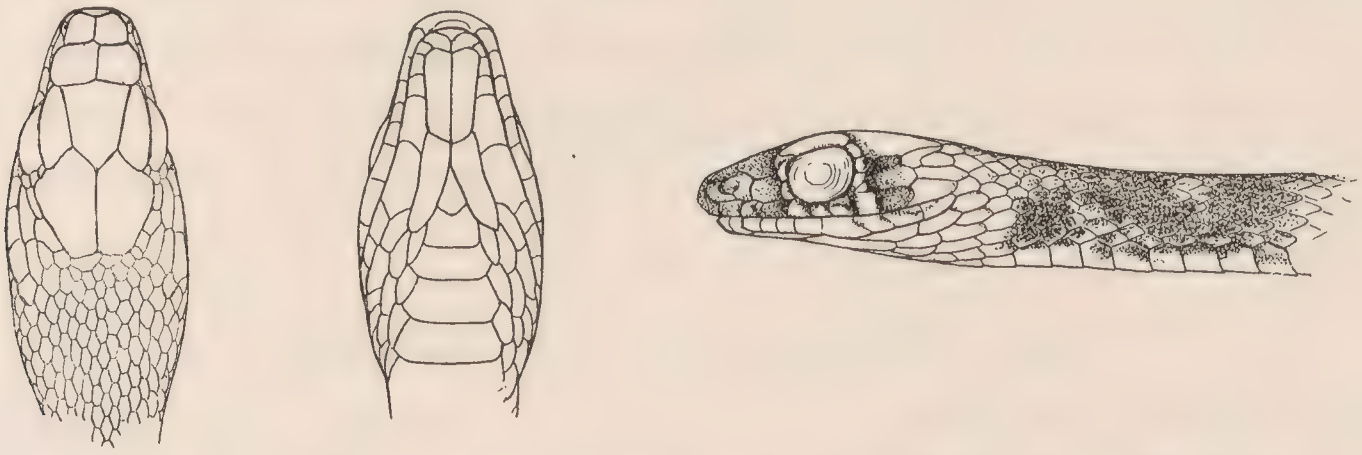

Fig. 15. *Natrix andrewsi*, new species, A. M. N. H. No. 28255, type.
Dorsal, ventral, and lateral views of head, × 2.

The color description is somewhat incomplete on account of the very deciduous scales, the specimen being otherwise well-preserved. Middle of back dark, the sides brownish, some of the lateral scales outlined with black; venter white, except ends of ventrals, which are punctate with black and black-tipped next to the first scale row; neck with a series of square light markings on each side, alternate, occupying the fourth to sixth scale rows; the first pair joins the diffuse, broad light nuchal band; top of head brown; a sharply defined vertical white bar on each side of the eye, the anterior one extending from the supra-ocular across the preocular and the fourth labial, the posterior on the postoculars, lower corner of the first lower temporal, and the middle of the seventh labial; both of these light bars are margined with black; the fifth and sixth labials each have a semicircular white spot; anterior labials brown; eighth labial brown, the ninth involved in the lighter nuchal band.

Total length 800 mm., tail-length 303 mm., ratio of tail to the total length, .34.

Range.—Known only from Hainan.

This species is evidently allied to *Natrix dendrophiops* Günther in dentition and habitus. It is apparently a very distinct form, otherwise unrelated to the Chinese or even Oriental water-snakes, unless it be *Natrix maculatus* Edeling, which has a very different dentition.[1]

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[1] Evidently identical with *Natrix ornaticeps* (Werner). While it is probable that Werner's paper (dated 1924) is the prior one, I reserve the necessary synonymic changes pending conclusive evidence on this point.

Trimerodytes balteatus Cope

Trimerodytes balteatus Cope, 1895, Proc. Acad. Nat. Sci. Phila., 1894, p. 426, Pl. x, fig. 2.

Tropidonotus balteatus Boulenger, 1896, 'Cat. Snakes Brit. Mus.,' III, p. 607.

Liparophis bedoti Peracca, 1904, Rev. Suisse Zool., XII, p. 663. Steindachner, 1906, Sitzber. Akad. Wiss. Wien (math.-natur.), CXV, Abt. 1, p. 905, Pl. Mell, 1922, Arch. Naturg., LXXXVIII, Abt. A, Heft 10, p. 118. Vogt, 1922, idem, p. 139.

Examination of two specimens of *Trimerodytes balteatus*, A. M. N. H. Nos. 27751–27752, from Nodoa leaves no possible doubt as to the identity of *Liparophis bedoti* with this species. The confusion is the evident result of Boulenger's rather offhand reference of *Trimerodytes* to *Tropidonotus*. This was the less justifiable as he described *Tapinophis* only a few years later, which, in turn, is doubtfully distinct from *Trimerodytes*, the differences in any case being not of generic value in Boulenger's own practice.

Scale Characters and Measurements

Museum Number	A. N. S. P. (Type)	A. M. N. H. 27751	A. M. N. H. 27752	Geneva Type of
Sex		♂	♂	*L. bedoti*
Dorsal Scales	19	19–17	19–17	19
Ventrals	202	202	205	196
Caudals	84	38	85	55
Upper Labials	9	8–9	9–8	9
Lower Labials	9	9–8	8–9	......
Pre+Postoculars	1+2–3	1+2	1+2	1+2–3
First+Second Row of Temporals	1 2	1 2	1⅔	1 2
Total-Length	377 mm.	536 mm.	597 mm.	717 mm.
Tail-Length	.21	.12	.21	.14

The only noteworthy difference to be explained in *L. bedoti* is the low number of subcaudals and the short tail, and this is amply accounted for by the short-tailed specimen at hand, which evidently has a broken tail but which has healed so perfectly that without the second specimen for comparison it might have passed as a complete one.

As there are three excellent descriptions of this species extant, it seems unnecessary to add to them. The specimens described and figured by Steindachner had complete tails, ranging from .20 to .23 of the total length. There is some anomaly in the specimen described by Mell and Vogt, as with 72 caudals its tail-length is only .14 of the total.

The color pattern of dorsal rings split by a narrow light band is very striking. It is evidently derivable from that of *Natrix percarinata*, to which *Natrix æquifasciata* Barbour is closely allied. The number of black rings in the present specimens is fifty and fifty-five, slightly higher than the number reported by Steindachner.

This species is now recorded from Indo-China ("'Cambodia and Tonkin") by Steindachner, and from Wutsung, Kwangtung, by Mell.[1]

"This species is quick and alert in its movements. It glides along in short grass with the body nearly straight. I could not persuade it to bite or even to assume a defensive position. When handled it does not hold itself rigid but hangs with muscles relaxed. It has the rather unusual habit of backing up over an obstruction, or backing into a hole or into a sack." (C. H. P.)

Pseudoxenodon melli Vogt

Figure 16

Pseudoxenodon melli Vogt, 1922, Arch. Naturg., LXXXVIII, Abt. A, Heft 10, p. 139. Mell, 1922, idem, p. 118, Pl. iv, fig. 3. Smith, 1923, Journ. Nat. Hist. Soc Siam, VI, p. 202.

A single specimen, A. M. N. H. No. 27753, from the mountains south of Nodoa, Hainan, is referable to this recently described species, which has been recorded from Hainan by Smith.

In its larger and more distinct head and its bold color pattern, this form contrasts strongly with other species of *Pseudoxenodon*. The present specimen presents some differences from Vogt's description, but it agrees in most characters, and its coloration and habitus are excellently shown in Mell's figure.

The differences in scale characters, together with those of *P. bambusicola* Vogt, are shown in the following tabulation:

	A. M. N. H. 27753	Malcolm A. Smith Coll.	Type of *P. melli*	Type of *P. bambusicola*
Sex	♂	♀	?	?
Dorsal Scales	19–17–15	....	19–17–15	19–17–15
Ventrals	140	141	136	132
Subcaudals	52	47	38	56
Upper Labials	8	......	8	8
Pre+Postoculars	1+3	......	1+3	1+2
First and Second Rows of Temporals	2—2	......	2—2	2—3
Total-Length	618 mm.	500 mm.	330 mm.	....
Tail-Length	102	80	45	....
Ratio, Tail to Total	.16	.16	.13	

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[1] Werner's reference of this species to *Liparophis* Peracca (Werner, 1926, p. 141) is of course untenable. Nor is it possible to maintain Peracca's species on the basis of a difference in coloration.

It will be seen that the Hainan specimen agrees in number of subcaudals with *bambusicola*. Vogt fails to mention the sex of his specimens, and the difference in tail-length between *bambusicola* and *melli* might well be a sexual one. Mell's field notes, however, indicate that he found the two forms in distinct habitats and geographic areas, and *bambusicola* may therefore be retained in spite of the fact that the present specimen bridges the gap between the two species.[1] The close agreement of the female specimen described by Smith from Nam-kao, Hainan, with the present specimen, indicates that Vogt's type may have had an unusually low number of subcaudals, or possibly an incomplete tail. Both of the two known Hainan specimens have the second pair of chin shields equal to the first, and five lower labials in contact with the first pair.

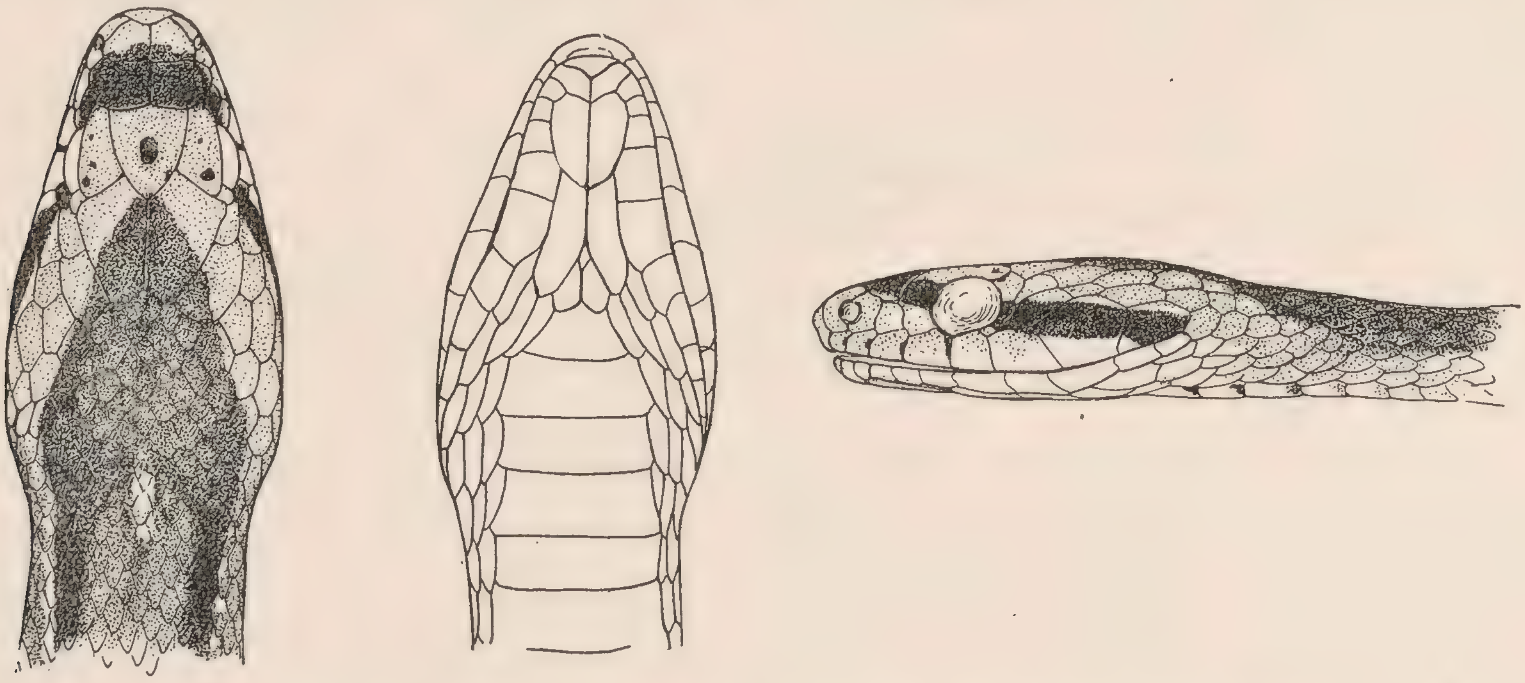

Fig. 16. *Pseudoxenodon melli* Vogt, A. M. N. H. No. 27753.
Dorsal, ventral, and lateral views of head, life size.

In Boulenger's description of the genus (1893, p. 270), apical pits are said to be wanting. I find them evident in this form, and they may be distinguished, by attentive examination, in *P. sinensis*.

Lycodon subcinctus Boie

Lycodon subcinctus Boie, 1827, Isis, p. 551. Boulenger, 1893, 'Cat. Snakes Brit. Mus.,' I, p. 359. Smith, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 202.

The single pecimen collected by Mr. Pope at Nodoa, A. M. N. H. No. 27755, is the second record of this species from Hainan, and it is as yet unknown from the Chinese mainland. It seems to be indistinguishable from the East Indian representatives of the species.

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[1] Werner (1926, p. 144) determines the type of *bambusicola* as the ♂ of *melli; P. bambusicola* has page priority over *melli* and is preferred by Werner, who may be regarded as first revisor. It should be employed in future for the form here described.

The dorsal scales are in 17–17–15 rows; ventral plates 197, subcaudals 77; upper labials 8 on each side; oculars 0–2; temporals 1–2. The total length is 564 mm., tail 112 mm., ratio of tail to length, .20.

Maxillary teeth 5+6, the anterior group strongly enlarged posteriorly, the posterior group subequal. The angular bend of the maxilla at the toothless interspace is much less marked than in *Lycodon aulicus.*

"The first specimen of this species was brought August 1st by the mission carpenter from the mission compound.

"While resembling the Krait in general appearance, the behavior of this species is radically different. It moves quickly through, or over, the short grass, with its head slightly raised. It could not be made to assume a defensive position, but would strike while in motion. When held down with a stick, it would strike with speed and vigor. The tail was repeatedly vibrated." (C. H. P.)

Ptyas mucosus (Linnæus)

Coluber mucosus LINNÆUS, 1758, 'Syst. Nat.,' Ed. 10, I, p. 226.

Ptyas mucosus COPE, 1860, Proc. Acad. Nat. Sci. Phila., p. 563. BŒTTGER, 1888, Ber. Offenbacher Ver. Naturk., XXVI–XXVIII, p. 75. STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 345, Figs. 298–300. SMITH, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 202.

Zamenis mucosus, BŒTTGER, 1894, Ber. Senck. Ges., p. 133; 1898, 'Kat. Rept. Mus. Senck.,' II, p. 41.

Eleven specimens, A. M. N. H. Nos. 27820–27830, of this widespread species were obtained.

There is no important variation to record. The upper labials are 8–9 in one specimen, 8–8 in the remaining; the lower labials are 9–10 in one, 10–10 in the rest; preoculars and postoculars invariably two; two anterior temporals, and one, two, or three in the second row, one appearing once, two fourteen times, and three seven times. The loreals vary from three to five, six specimens having three on each side, while four have four on each side and one has five on one side, four on the other.

The dorsal scale rows are 21 or 19 on the neck, invariably 17 at midbody, and invariably 14 near the tail. The median row is lost opposite the 102d to 120th ventral, and the third row of each side is dropped a short distance farther back. The full scale formula for this form is therefore 21–19–17–16–14. The keels of the median four to six dorsal scale rows begin about mid-body, the anterior dorsals being perfectly smooth.

The largest male specimen measures 2118 mm., the largest female 1518 mm.

Summary of Ventrals, Caudals and Proportionate Tail-Length

	Sex	No. of Specimens	Extremes	Average
Ventrals	♂	7	194–200	197
	♀	7	193–200	196
Caudals	♂	7	112–118	116
	♀	7	111–118	114
Tail-Length	♂	2	.24–.26	.25
	♀	4	.25–.27	.26

"This snake is the most abundant large snake of the region. I saw one myself as it crossed the road in front of me half-way between Nodoa and Nam Fong.

"Its temperament is surprisingly inoffensive. When handled, it often wraps a loop around one's arm, tucking in the tail and exerting considerable pressure. When teased, its only reaction is an attempt to escape. When cornered, it inflates the neck and hisses." (C. H. P.)

Ptyas korros (Schlegel)

Coluber korros Schlegel, 1837, 'Phys. Serp.,' II, p. 139.

Ptyas korros Cope, 1860, Proc. Acad. Nat. Sci. Phila., p. 563. Bœttger, 1888, Ber. Offenbacher Ver. Naturk., XXVI–XXVIII, p. 75. Stejneger, 1907, Bull. U. S. Nation. Mus., No. 58, p. 348. Smith, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 202.

Zamenis korros Boulenger, 1893, 'Cat. Snakes Brit. Mus.,' I, p. 384. Bœttger, 1894, Ber. Senck. Ges., p. 75; 1898, 'Kat. Rept. Mus. Senck.,' II, p. 41. Stanley, 1914, Journ. N. China Br. Roy. Asiatic Soc., XLV, p. 27.

Nine male specimens, A. M. N. H. Nos. 27811–27819, represent this form in the present collection.

The upper labials are uniformly 8; the lower labials 10 in seven specimens, 9–10 in one, 8–9 in one; three preoculars on one side of one specimen, otherwise regularly two; two postoculars; temporals 2–2 on each side except in one specimen, which has 2–3 on one side; loreals 2 on both sides in four, 3 in three, and 2–3 in two specimens.

The dorsal scales are in seventeen rows anteriorly in two specimens, fifteen in the remaining seven, uniformly fifteen at mid-body and eleven posteriorly.

No. 27811, measuring 405 mm. in length, shows the juvenile pattern of narrow white transverse lines across the anterior part of the body.

Summary of Ventrals, Caudals and Proportionate Tail-Length

	Sex	No. of Specimens	Extremes	Average
Ventrals	♂	9	165–175	168
Caudals	♂	7	128–141	134
Tail/Total Length	♂	7	34–36	.35

"This species is fairly abundant. It is quick in its movements. When held by the neck, it makes the usual violent effort to escape of a whip-snake, thrashing the body and twisting upon itself. It did not have a special defensive attitude, but when teased would follow the annoying object with its head and occasionally bite rather ineffectually. On being teased, one specimen would bite itself viciously several times." C. H. P.

Elaphe porphyracea (Cantor)

Coluber porphyracea Cantor, 1839, Proc. Zoöl. Soc. London, p. 51. Boulenger, 1894, 'Cat. Snakes Brit., Mus.,' II, p. 34.

Elaphe porphyracea Barbour, 1912, Mem. Mus. Comp. Zoöl., XLIV, p. 195.

Two specimens of this extremely distinct species are at hand from Hainan, A. M. N. H. Nos. 27757–27758, the first record of this form from the island.

The coloration agrees in general with that of mainland specimens. There are eleven black cross-bands on the body of the smaller specimen, with two on the tail. The posterior cross-bands are fainter in both specimens, and only nine can be distinguished in the larger. The dorsolateral black lines are less complete in the smaller specimen. The characteristic head-pattern is present.

Scale Characters and Measurements

A. M. N. H. No.	27757	27758
Sex	♂	♂
Dorsal Scales	19–17	19–17
Ventrals	198	202
Caudals	75	79
Upper Labials	8	8
Lower Labials	10	10
Preoculars	1	1
Postoculars	2	2
Temporals	1–2	1–2
Total Length	736 mm.	817 mm.
Tail-Length	140	156
Tail/Total Length	.19	.19

Elaphe tæniura vaillanti (Mocquard)

Coluber vaillanti Mocquard, 1905, Bull. Mus. Hist. Nat. Paris, XI, p. 76; Bull. Soc. Philom. Paris, (9) VII, p. 319, Fig. 2.

A single *Elaphe* of the *tæniura* group, A. M. N. H. No. 27756, was bought by Mr. Pope at Nam Fong.

This specimen agrees excellently with the figure given by Mocquard, and differs in both pattern and scale characters from typical *tæniura*.

Top of head uniform grayish brown; chin and supra-labials yellowish; a black stripe on the side of the head, faint from the nasal to the eye, distinct from the eye to the angle of the jaw; neck, for a distance equal to about four head lengths, uniform grayish brown; behind this are bold black longitudinal markings, in four rows, on the 2d-5th and 8th-10th scale rows; those of the lower row alternate with those of the upper, the upper with a slight tendency to be connected across the back to form an H-shaped mark; about mid-body these markings become faint; posterior to this, the black markings of each side unite to form a solid broad longitudinal band, leaving a sharply defined light line on the mid-dorsal and adjacent half scale rows; a well-marked light lateral stripe on the lower half of the first scale row and the ends of the ventrals borders the dark bands below; ventrals yellowish, mottled with gray at their ends; posteriorly this gray mottling unites to outline the lateral light lines, leaving a fourth light, mid-ventral, line; all four light lines continued to the tip of the tail; no vertical white bars on the dark lateral longitudinal bands.

Scale Characters and Measurements

	A. M. N. H. No. 27756	Type of *vaillanti*
Dorsal Scales	25–23–19	23
Ventrals	259	256
Caudals	120	106
Upper Labials	9	9
Lower Labials	11	..
Preoculars	2	2
Postoculars	2	2
Temporals	2–3	3–
Total-Length[1]	1960 mm.	
Tail-Length	465	
Tail/Total Length	.24	

Stejneger (1907, p. 319) has given an excellent account of the typical form of this species. He states that *Elaphe schmackeri*, to which the present specimen is most closely allied in scale characters, has the coloration of typical mainland *tæniura*. This is not the case in the Hainan and Tonkinese specimens, whose pattern is strikingly different in detail from central Chinese specimens, though agreeing in general plan.

The high number of subcaudals in the Hainan specimen is equalled only in *schmackeri*, and, were the latter not also an insular form, it would certainly have to be united with *tæniura* as a subspecies. It seems preferable to retain *vaillanti* for the southeastern form of *tæniura*, its chief distinguishing character being the absence of the numerous dark anterior dorsal crossbars of northern *tæniura* and of *schmackeri*.

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[1] A skin, with head attached, measurements therefore unreliable.

Ahætulla boiga (Lacépède)[1]

Coluber boiga Lacépède, 1789, 'Hist. Nat. Serp.,' II, pp. 102 (Tabl. Method.) and 223 (text).

Dendrophis pictus Boulenger, 1894, 'Cat. Snakes Brit. Mus.,' II, p. 78.

A single specimen in the Nodoa collection adds this species to the Hainan fauna, A. M. N. H. No. 27754, collected July 28, 1923.

Scale Characters and Measurements

A. M. N. H. No.	27754
Sex	♀
Dorsal Scales	15–13–11
Ventrals	191
Caudals	155
Upper Labials	9
Lower Labials	10
Preoculars	1
Postoculars	2
Temporals	2–2
Length	944 mm.
Tail-Length	322
Tail/Total Length	.34

This specimen differs from the descriptions of Oriental representatives of the species in lacking the lateral stripe on the lowermost scale row.

Holarchus violaceus (Cantor)

Coronella violacea Cantor, 1839, Proc. Zoöl. Soc. London, p. 50.

Simotes sp., Swinhoe, 1870, Proc. Zoöl. Soc. London, p. 240.

Simotes violaceus Boulenger, 1894, 'Cat. Snakes Brit. Mus.,' II, p. 222; 1896, idem, III, p. 640. Stanley, 1914, Journ. N. China Br. Roy. Asiatic Soc., XLV, p. 27.

Holarchus dolleyanus Cope, 1895, Proc. Acad. Nat. Sci. Phila., 1894, p. 423, Pl. x, fig. 1.

Holarchus violaceus Stejneger, 1907, Bull. U. S. Nation. Mus., No. 58, p. 354. Smith, Journ. Nat. Hist. Soc. Siam, VI, p. 203.

Forty-three specimens of this species are in the collection, A. M. N. H. Nos. 27867–27909.

The upper labials, in this series, range from five to eight, eight being the most frequent number. The lower labials vary from six to eight, seven and eight being nearly equally frequent. The preocular is single forty times, two forty-six times. The postoculars are regularly two in number, but are single on both sides in six specimens. The anterior temporal is normally single, but two occur ten times, and in one specimen the parietals meet the upper labials on both sides. The second row of temporals contains two scales in fifty-nine cases, one in twenty-four, and three in three. Undivided subcaudals appear in three specimens, from one to four in number.

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[1] The use of this name for *Dendrophis pictus* auct. was suggested to me, in conversation, by Dr. Leonhard Stejneger, and it is here employed for the sake of uniformity with Dr. Stejneger's future publications on Chinese herpetology.

The fourth dorsal scale row drops out between the eightieth and ninetieth ventrals, at about mid-body. The number of rows varies from 17–15 to 15–13, as follows:

Dorsal Rows	No. of Specimens
17–17–15	35
15–17–15	1
17–15–13	4
15–15–15	2
15–15–13	1

The largest male measures 562 mm., the largest female 480 mm.

Summary of Ventrals, Caudals and Proportionate Tail-Length

	Sex	No. of Specimens	Extremes	Average
Ventrals	♂	23	157–168	164
	♀	20	161–173	167
Caudals	♂	23	35– 45	38
	♀	20	30– 39	34
Tail/Total Length	♂	23	.13–.15	.14
	♀	20	.11–.14	.12

The coloration of this series agrees with that of Boulenger's series B, for which the name *swinhonis* Günther, type locality Amoy, is available, should it prove desirable to separate the Chinese from the Indian form. The type locality of *violaceus* is Rungpore (=Rangpur), N. E. India.

"This species seems to be one of the commonest snakes in the open grassy country around Nodoa. I met with several myself in the late afternoon.

"When handled, one of these snakes rarely attempts to bite but coils around one's hand and presses against it vigorously with the sharp tip of its tail. One did bite my Chinese assistant's thumb, with no bad effect.

"When annoyed, the tip of the tail is sometimes curled into a complete circle.

"One of these snakes became suddenly very active and vicious when attacked by a baby mongoose, striking at the mongoose and repeatedly driving it away. Thereupon it struck at any object brought near and vibrated its tail.

"These snakes are much feared by the Chinese." (C. H. P.)

Holarchus formosanus hainanensis (Bœttger)

Simotes hainanensis Bœttger, 1894, Ber. Senck. Ges., 1894, p. 133, Pl. iii, fig. 2.

Simotes formosanus Bœttger, 1898, 'Kat. Rept. Mus. Senck.,' II, p. 73.

Holarchus formosanus Stejneger, 1907, Bull. U. S. Nation. Mus., No. 58, p. 354 (in part).

Holarchus formosanus hainanensis Barbour, 1909, Proc. New England Zoöl. Club, IV, p. 70.

Eight specimens of this *Holarchus* were collected, A. M. N. H. Nos. 27796–27803.

One specimen has seven upper labials on each side, the 3d and 4th entering the eye, the rest have eight, with the 4th and 5th entering the eye. The lower labials are 8–9 in two specimens, 9–9 in six. There are invariably two preoculars and two postoculars. Two anterior temporals occur twice, one is normal; one temporal in the second row occurs once, two fifteen times, and three twice.

The dorsal scale count is slightly different in the two sexes; in the three female specimens it is 19–17, in one male 19–17, in four 19–17–15.

The largest male specimen measures 723 mm., the largest female 481 mm.

Summary of Ventrals, Caudals and Proportionate Tail-Length

	Sex	No. of Specimens	Extremes	Average
Ventrals	♂	5	165–171	168
	♀	3	175–178	177
Caudals	♂	5	54– 59	56
	♀	3	50– 51	50
Tail/Total Length	♂	5	.18–.19	.19
	♀	3	.16–.17	.16

Small specimens have a much more sharply defined pattern.

Barbour, 1909, p. 70, retains the name *hainanensis* as a subspecies of *formosanus*, chiefly on the basis of color differences between Formosan and Hainan specimens. There seems to be a considerable difference in the average number of ventrals in specimens from the two islands, the average for eight specimens from Formosa (of both sexes) being 164.4, and of the twelve specimens now known from Hainan, 170.3, the respective extremes being 161–172 and 165–178. The contact of the parietal with the lower postocular, which Stejneger records as the usual condition in *formosanus*, does not occur in the specimens examined by me, nor is the exceptional upper anterior temporal to be thought of as cut off from the parietal.

The specimen recorded by Boulenger from Swatow, with 173 ventrals, suggests that it is the Hainan form rather than the Formosan which is found on the mainland.

Enhydris plumbea (Boie)

Homalopsis plumbea Boie, 1827, Isis, p. 550.

Hypsirhina plumbea Bœttger, 1888, Ber. Offenbacher Ver. Naturk., XXVI–XXVIII, p. 83; 1894, Ber. Senck. Ges., p. 134. Boulenger, 1896, 'Cat. Snakes Brit. Mus.,' III, p. 5. Bœttger, 1898, 'Kat. Rept. Mus. Senck.,' II, p. 87.

Enhydris plumbea Stejneger, 1907, Bull. U. S. Nation. Mus., No. 58, p. 300, Figs. 260–262. Barbour, 1909, Proc. New England Zoöl. Club, IV, p. 68. Smith, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 203.

One hundred and twelve specimens of this common form, A. M. N. H. Nos. 27997–28107, 28045*a*, were collected.

The upper labials are eight in one hundred and ten specimens, 7–8 in one, and 8–9 in one. The lower labials range from nine to eleven, but one hundred and five specimens have ten on both sides. The preocular is usually single, two preoculars occurring twenty-seven times. The postoculars are even more constantly two in number, a single postocular occurring only seven times. A single anterior temporal is invariable, and in the second row, two are present in all but five counts, in each case on only one side of a specimen.

The dorsal scale rows vary from 20–16 to 19–15, the counts distributed as follows:

Count	No. of Specimens	
	♂	♀
20–19–17–16	1	
19–17	39	50
19–17–16	4	2
19–17–15	13	3

Summary of Ventrals, Caudals, and Proportionate Tail-Length

	Sex	No. of Specimens	Extremes	Average
Ventrals	♂	57	125–136	129
	♀	55	123–132	128
Caudals	♂	53	36– 42	39
	♀	54	31– 36	34
Tail/Total Length	♂	53	.13–.15	.14
	♀	54	.11–.14	.12

Three stomachs contained the remains of a *Rana* sp., and two remains of *Microhyla*, the great majority of stomachs being empty.

A number of females contained undeveloped eggs, the number of enlarged ones ranging from four to eleven. One specimen contained four eggs (about 10×12 mm.), each with a small embryo.

"The common, gray water-snake bites viciously when caught with a noose, biting the stick and finally biting itself. When released in grass, it crawls slowly close to the ground, where it is well hidden."

Enhydris chinensis (Gray)

Hypsirhina chinensis Gray, 1842, 'Zool. Misc.,' p. 73. Bœttger, 1888, Ber. Offenbacher Ver. Naturk., XXVI–XXVIII, p. 82; 1894, Ber. Senck. Ges., p. 134. Boulenger, 1896, 'Cat. Snakes Brit. Mus.,' III, p. 8, Pl. i, fig. 2. Bœttger, 1898, 'Kat. Rept. Mus. Senck.,' II, p. 88.

Enhydris chinensis Smith, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 203.

Forty-six specimens of this species, A. M. N. H. Nos. 27951–27996, were collected at Nodoa.

Like *Enhydris plumbea*, this species is a stable one in all of its characters. Eight is the normal number of upper labials, 8–9 occurring twice and 9–9 once. Ten is the usual number of lower labials, 9–10 occurring in four specimens, and 10–11 in one. The only variation from a single preocular occurs on one side of the one specimen, which has two, and two postoculars are equally constant, a single one on one side of one specimen being the only exception. The temporals are invariably 1–2 on each side. A single specimen has two internasals. The dorsal scale count varies from 25–21 to 23–17, seventeen specimens having a dorsal scale formula of 25–23–21–19, and seventeen 23–21–19. There is a very slight tendency to higher numbers of dorsal scale rows in the females.

The range in ventral scales is somewhat lower than that given by Boulenger (see below), which is accounted for in part by his having only one female specimen, although Bœttger's account (1888, p. 82) of fifteen specimens from Canton also shows a higher ventral and subcaudal count.

The largest male specimen measures 516 mm.; the largest female, 567 mm.

Summary of Ventrals, Caudals and Proportionate Tail-Length

	Sex	No. of Specimens	Extremes	Average
Ventrals	♂	26	135–147	143.5
	♀	20	134–141	137.6
Caudals	♂	26	40– 52	48.
	♀	19	35– 43	39.5
Tail/Total Length	♂	26	.15–.18	.16
	♀	19	.12–.14	.13

The stomachs of two specimens contained remains of fish, and one of these stomachs also contained a large mass of parasitic worms.

"When picked up suddenly with a pair of forceps, this snake makes wild efforts to bite, waving its open jaws about and sometimes biting itself. When teased in a box, it would actually spring about, jumping clear of the bottom and advancing as much as a foot at each jump. After a few wild efforts it would subside and assume a defensive posture striking viciously at any object brought near. At such times the body is flattened. On a smooth floor it progresses rapidly with a series of crawling "leaps," the body being apparently raised clear of the floor with every spasmodic motion.

"A large female was kept in a water-jar and the frequency of respirations observed. If given half a chance these snakes make for water, and they lie contentedly at the bottom, nearly motionless, if placed in a water jar. Seven intervals between respirations varied from ten to fifteen minutes, averaging between thirteen and fourteen minutes. Respiration occupied from one to five minutes, only the tip of the snout being exposed.

"A large female, taken July 30th, contained six fully developed young, of which the largest measured 157 mm. in length." (C. H. P.)

Boiga multimaculata (Boie)

Dipsas multimaculata Boie, 1827, Isis, p. 549.

Dipsadomorphus multimaculatus Boulenger, 1896, 'Cat. Snakes Brit. Mus.,' III, p. 63.

Boiga multomaculata Barbour, 1909. Proc. New England Zoöl. Club, IV, p. 72.

Boiga multimaculata Smith, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 203.

This species is represented by twenty-three specimens, A. M. N. H. Nos. 27844–27866.

The upper labials are regularly eight, seven appearing once and nine four times. The lower labials are regularly eleven, ten occurring twice and twelve three times. The preoculars are two in two specimens, one in the rest, the postoculars normally two, with three appearing twice. The number of temporals in the first row is one to three, one occurring nine times, two thirty-two times, and three once; the second row varies from two to four, two in fifteen counts, three in twenty-seven, and four in two.

The dorsal scales differ slightly in the sexes, as follows:

19–17–15	♂, 3	♀, 8
19–17–15–13	♂, 9	♀, 3

The largest male measures 836 mm., the largest female 834 mm.

Summary of Ventrals, Caudals and Proportionate Tail-Length

	Sex	No. of Specimens	Extremes	Average
Ventrals	♂	12	200–213	209
	♀	11	207–221	215
Caudals	♂	12	82– 98	92
	♀	10	80– 97	89
Tail/Total Length	♂	12	.20–.22	.21
	♀	10	.19–.22	.20

Three specimens had bird remains in their stomachs (one a *Motacilla* sp.), and one a lizard, *Calotes versicolor.*

This species was recorded from Hainan by Barbour, but omitted by both Vogt and Mell from their Hainan lists.

"The numbers of this snake brought in show that it is fairly abundant about Nodoa. Two specimens were taken in the mission compound. I believe its habitat to be thick bushes and brush. The Chinese say that it is fond of bird's eggs and birds. Two specimens brought in disgorged bird remains.

"When annoyed, the 'Blotched Snake' assumes a defensive posture with the anterior part of the body thrown into several symmetrical S-shaped loops, with the neck strongly compressed and the head expanded at the rear. The tip of the tail may be strongly vibrated, producing a distinct noise among dry leaves. It strikes viciously and in a very business-like manner. The range of the stroke in a twenty-eight inch specimen was about twelve inches.

"One of these snakes was bitten several times by a three and one-half foot krait, without visible effect." (C. H. P.)

Psammodynastes pulverulentus (Boie)

Psammophis pulverulenta Boie, 1827, Isis, p. 547.

Psammodynastes pulverulentus Günther, 1858, 'Cat. Colubrine Snakes Brit. Mus.,' p. 140. Boulenger, 1896, 'Cat. Snakes Brit. Mus.,' III, p. 172. Stejneger, 1907, Bull. U. S. Nation. Mus., No. 58, p. 383, Figs. 317–319. Barbour, 1912, Mem. Mus. Comp. Zoöl., XLIV, p. 127.

Psammodynastes pulverulentis Stanley, 1914, Journ. N. China Br. Roy. Asiatic Soc., XLV, p. 29.

Seven specimens of this form are in the present collection from Hainan, A. M. N. H. Nos. 27781–27787.

In this series the dorsal scales are uniformly 17–15. The ventrals, in six male specimens, range from 157–167, average 162, and are 171 in the single female. The caudals, in the males, range from 61 to 70, average 64.5, 59 in the female. The upper labials are invariably eight, the lower labials eight except for the occurrence of seven on one side in one specimen. The preoculars are two eleven times, one three times. The postoculars are invariably two. The first temporals are uniformly two, the second two with an exceptional three. The tail-length varies from .21 to .24 of the total in males, .18 in the female specimen.

The largest male measures 506 mm., the single female 380 mm.

One specimen represents the dark brown phase of this species, the rest belong to the more common gray form.

Barbour's record of this species from Hainan was missed by both Vogt and Mell in their lists of species recorded from Hainan. Hainan specimens are also mentioned by Stanley. Stejneger's prediction that this species might be expected on the Chinese mainland has been abundantly justified by the records from Fukien (Stanley) and Kwangtung (Mell).

"Under this head I seem to have either two species or two varieties, a dark and a light. The dark form is extremely rare, while the light is not common.

"This viper-like snake was brought in about the first of June by a little boy. The snake was tied along a stick but it was undaunted and at the slightest annoyance it opened its mouth and showed its little fang sheaths, biting viciously anything put in its jaw. It proved to be very active. When I put it out on the porch it started away, progressing by means of a series of peculiar half leaps. The body was drawn up and then extended vigorously in such a way that the snake appeared to be jumping. It moved rapidly across the smooth boards, an unusual feat for a snake. I have never seen a snake come nearer to actual jumping than this little specimen. While controlling the snake's direction with the point of an umbrella, I noticed that the snake tried to crawl up the umbrella. It climbed with facility, and has thoroughly mastered the art of climbing a smooth vertical stick by holding itself in place with one tight coil while freely working the rest of its body. When put in a small tree it immediately climbed up and showed itself most expert in sliding along small branches. Its ability to project its head, unsupported, upward, and reach for a distant twig, is notable. When put on the tip of a drooping limb it went straight up, when it might easily have dropped to the soft grass only a foot below. After being released, its viciousness did not appear so pronounced. It became more interested in escaping than in fighting. However, I did not dare test its good nature with anything but a stick, and so expert a climber could not be expected to be afraid of a stick. Its color is protective only in that it matches branches or dead leaves.

"A light-colored specimen, brought in later, apparently did not want to climb. This may have been only an individual difference." (C. H. P.)

Naja naja atra (Cantor)

Naja atra CANTOR, 1842, Ann. Nat. Hist., IX, p. 482.

Naja tripudians BŒTTGER, 1888, Ber. Offenbacher Ver. Naturk., XXVI–XXVIII, p. 85; 1894, Ber. Senck. Ges., p. 134.

Naia tripudians var. *fasciata* BOULENGER, 1896, 'Cat. Snakes Brit. Mus.,' III, p. 383.

Naja tripudians var. *fasciata* BŒTTGER, 1898, 'Kat. Rept. Mus. Senck.,' II, p. 121.

Naja naja atra STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 394. BARBOUR, 1912, Mem. Mus. Comp. Zoöl., XLIV, p. 136.

Naia naia atra BARBOUR, 1909, Proc. New England Zoöl. Soc., IV, p. 72.

The common cobra of southern China is represented by thirteen specimens, A. M. N. H. Nos. 27831–27843.

This series corroborates Stejneger's view of the characters of this subspecies. The upper labials are normally seven, with eight on one side in a single specimen. The lower labials are nine with a single exceptional eight. There is invariably a single preocular, and three postoculars in all except one case, which has two. The anterior temporals are always two, the second row varying from two to four, usually three.

The scales at mid-body are in twenty-one rows in twelve specimens, nineteen in the remaining one. On the neck the scale rows are twenty-five in three specimens, twenty-seven in six, and twenty-nine in four.

The largest male measures 1488 mm., the largest female 1473 mm.

Summary of Ventrals, Caudals and Proportionate Tail-Length

	Sex	No. of Specimens	Extremes	Average
Ventrals	♂	8	164–172	168
	♀	5	169–177	173
Caudals	♂	7	41– 51	47
	♀	5	39– 47	45
Ventrals+Caudals	♂+♀	12	208–223	216
Tail/Total Length	♂	4	.14–.17	.16
	♀	3	.14	.14

The coloration of these series is variable upon a rather distinct and striking fundamental plan. The venter is dark, light on the chin and throat, and the subcaudals light with dark outlines. There is a broad black crossband on the throat just posterior to the position of the hood-mark, which covers five or six ventrals and meets the dark dorsal color. Just anterior to the hood-mark, on the throat, is a second transverse black band, which may be poorly defined, or absent. In the latter case, however, its ends, which do not reach the dark dorsal color, remain as a pair of black latero-ventral spots. The general dorsal color is black, with six to eight light crossbands on the posterior half, each consisting of a pair of narrow light lines, with several more irregular transverse markings on the tail. The hood is marked with a round, heart-shaped, or diamond-shaped light area, which may be joined to the light color beneath the neck, and which encloses a large central black spot, with a smaller one on each side of it.

The pairs of light lines may unite laterally; they may alternate with single transverse light lines; and there may be single transverse lines on the anterior half of the body. No. 27837 exhibits this pattern in its extreme development, with five distinct, single, transverse light lines on the anterior half of the body, and eight pairs of lines on the posterior half, with irregular transverse markings on the tail. This is not at all a juvenile pattern, as it is least marked on a small specimen, No. 27834, which has only a few single, short, light transverse markings on the posterior part of the back. The figure of a Sumatran cobra given by Ditmars (1910, 'Reptiles of the World,' Pl. LXVII), shows the transverse light markings in pairs anteriorly, with a hood marking like that of the Hainan series.

"The cobra is common, as is shown by the number of specimens collected. Many more could have been secured if we had taken dead specimens. The Chinese are much afraid of these deadly snakes. It has been a surprise to me that they can be so easily managed. I do not consider the cobra to be aggressive. None of our specimens showed any inclination to attack a man. Instead of showing fight when teased, they constantly attempt to escape, and only adopt a defensive attitude as the last resort.

"I have not seen a cobra outside. One was caught in a rat-trap, and one was found in the Mission compound.

"Small cobras are especially swift and agile, and older ones are alert and active. When they bite, they chew away until certain that their fangs have reached their mark. They quickly learn that it is useless to bite wood. When enraged, they will sometimes bite themselves.

"The behavior of cobra and mongoose was tested twice, once with a five-foot snake and a small mongoose and once with a three-foot cobra and a large mongoose. Both cobra and mongoose gave every evidence of regarding their opponents as dangerous enemies and, when placed together in a room each concentrated its attention on the other. Contrary to popular ideas of the mongoose's mode of attack, each of these specimens attacked the cobra at the moment when the latter struck, biting at the snake's open mouth so that snake and mongoose jaws became repeatedly interlocked. The snake's stroke was avoided, usually with a single motion of the head, except when it was caught in the open mouth of the mongoose. It is difficult to understand these tactics, for the snakes could scarcely fail to inoculate their enemy with poison. The small mongoose failed to kill its cobra, and died itself on the second day after the fight, but with no evident effects from the poison (it was apparently weak when brought to us). The larger mongoose killed its enemy and showed no ill effects from the encounter. Neither mongoose made the slightest attempt to attack the cobra from behind. The larger mongoose repeatedly approached the cobra and lay down on its side, just beyond reach of the cobra's stroke, keeping its eyes fixed on snake, and raising its head to keep it in view—a most peculiar and inexplicable performance." (C.H. P.)

Bungarus multicinctus Blyth

Bungarus multicinctus Blyth, 1861, Journ. Asiatic Soc. Bengal, XXIX, p. 98. Stejneger, 1907, Bull. U. S. Nation. Mus., No. 58, p. 397, Figs. 325–327.

Bungarus candidus var. *multicinctus* Boulenger, 1896, 'Cat. Snakes Brit. Mus.,' III, p. 369.

A. M. N. H. Nos. 27789–27795, seven specimens, represent this species in the present collection.

Both upper and lower labials are uniformly seven. The preocular is single and there are two postoculars in all. The anterior temporal is invariably single, and those of the second row are usually two, exceptionally one or three. The dorsal scales are uniformly fifteen throughout the length except in one specimen, which has seventeen rows on the neck. The ventrals in the single male are 211, the subcaudals 48. In the six females, ventrals and subcaudals average 212 and 50, respectively, ranging from 207 to 214 and from 47 to 53. The tail-length is .12 of the total in the male, and ranges from .12 to .14 of the total in the six females.

The male specimen measures 1333 mm., the largest female 1354 mm.

The number of light crossbands on the back varies from 32 to 40, and those on the tail range from 9 to 15. The scales in the light bands are dotted with brown in the larger specimens.

"I found a specimen of the krait while hunting tree frogs at night, in the small banana grove just back of Mr. Leverett's house. It made no effort to escape when the light was flashed on it. Dr. Salsbury tells me of another specimen having been killed on a tennis court at night some time ago.

"All of the specimens observed seemed very inoffensive. When teased with a stick, they coil with the body somewhat flattened and with the head concealed in the center of the coil. If the teasing is then continued, they make spasmodic jerks, throwing the body around, but making no effective effort to escape. In no case did these snakes strike. They occasionally bit the stick with which they were teased, and two specimens confined together bit each other. Two of the specimens could not be induced to bite at all.

"This snake is much feared by the Chinese, which is perhaps why we have been able to secure only a few specimens." (C. H. P.)

Calliophis macclellandii (Reinhardt)

Elaps macclellandii Reinhardt, 1844, Calcutta Journ. Nat. Hist., IV, p. 532.

Callophis macclellandii Günther, 1864, 'Rept. Brit. India,' p. 349.

Calliophis macclellandii Stejneger, 1907, Bull. U. S. Nation. Mus., No. 58, p. 391, Figs. 323–324.

Five specimens, A. M. N. H. Nos. 27776–27780, form the first record of this species from Hainan.

Upper labials six in one case, seven in the rest; lower labials uniformly six; preoculars one, postoculars two; temporals 1–1 on each side; dorsal scales in thirteen rows. Variation in tail-length, ventrals and caudals does not appear to be correlated with sex. Ventrals range from 205 to 216, average 210; subcaudals from 36 to 38; tail-length from .11 to .12 of the total.

The largest male measures 460 mm., the largest female 419 mm.

The color pattern of No. 27777 may be described as follows: reddish brown above, each scale with a darker tip; back crossed at regular intervals by short, narrow, straight black lines, twenty-six in number, reaching the third or fourth scale row; venter yellowish cream color, with fifty-three black blotches, which do not reach the ends of the ventrals, each alternate mark opposite a dorsal line; these cover one or two ventrals, and are frequently offset on the median line; four dorsal black lines on the tail and nine black markings beneath; a nuchal collar, and anterior part of head black, with a vivid yellow band which covers the sixth and seventh labials, the temporals, and the parietals; anterior labials and lower half of rostral lighter. No. 27779 has the dorsal transverse markings broader (half or two-thirds the length of a scale), slightly shorter from side to side, and outlined with light. In No. 27776 the dorsal marks are reduced to spots, usually on alternate sides of the midline, and the ventral blotches are enlarged, covering from two to five ventrals, and only forty-six in number. This apparently is the color-variety *C. m. gori* Wall, of Assam (Wall, 1918, Journ. Bombay Nat. Hist. Soc., XXV, p. 631).

"Dr. Salsbury brought a specimen of the 'Hainan coral snake' from Kachek. The Chinese say that this species is nocturnal. One specimen would only coil around and around, if annoyed, and keep its head in the center of the regular coils. It could not be induced to strike or assume an offensive attitude, nor could it be made to bite. It crawls in a straight line with a smooth gliding motion." (C. H. P.)

Amblycephalus moellendorffii Bœttger

Pareas moellendorffii Bœttger, 1885, Ber. Offenbacher Ver. Naturk., XXIV–XXV, p. 125; 1888, idem, XXVI–XXVIII, p. 84, Pl. ii, fig. 1. Cope, 1895, Proc. Acad. Nat. Sci. Phila., (1894), p. 424.

Amblycephalus moellendorffii Boulenger, 1896, 'Cat. Snakes Brit. Mus.,' III, p. 443. Smith, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 204.

Seven specimens, A. M. N. H. Nos. 27769–27775, in the present collection.

The upper labials are seven, six on one side of one specimen, the lower labials seven, eight on one side of one specimen. One preocular and one postocular in all. Temporals 2–2 to 2–4. Three pairs of chin shields in six specimens, four in one. The dorsal scales are in fifteen rows throughout the body. The ventrals range from 139 to 142 in five males, average 140, and from 147 to 150 in the two females. The caudals in the male specimens range from 52 to 58, average 54, in females 41 to 43. The tail-length in males ranges from .22 to .24 of the total, average .23, in the two females it is only .15 and .16.

The coloration agrees with descriptions and with Bœttger's figure.

The fact that this snake is fairly abundant in Hainan, together with Boulenger's record from Hongkong, disposes of the supposition of Mell and Vogt that this species is replaced in Kwangtung by *A. kuangtungensis.*

Crotalidæ

Trimeresurus gramineus (Shaw)

Coluber gramineus Shaw, 1802, 'Gen. Zool.,' III, Pt. 2, p. 420.

Trimeresurus gramineus Günther, 1864, 'Rept. Brit. India,' p. 385. Bœttger, 1894, Ber. Senck. Ges., p. 135. Stanley, 1914, Journ. N. China Br. Roy. Asiatic Soc., XLV, p. 31 (part). Smith, 1923, Journ. Nat. Hist. Soc. Siam, VI, p. 205.

Trimeresurus erythrurus Bœttger, 1888, Ber. Offenbacher Ver. Naturk., XXVI–XXVIII, p. 91.

Lachesis gramineus Boulenger, 1896, 'Cat. Snakes Brit. Mus.,' III, p. 554 (part). Bœttger, 1898, 'Kat. Rept. Mus. Senck.,' II, p. 139 (part).

Trimesurus albolabris Gray, 1842, 'Zool. Misc.,' p. 48.

Trimeresurus gramineus albolabris Mell, 1922, Arch. Naturg., LXXXVIII, Abt. A, Heft 10, p. 126.

Forty-one specimens of this species were brought to Mr. Pope at Nodoa, A. M. N. H. Nos. 27910–27950.

In this series, the preoculars are two or three, according as the scale bordering the loreal pit below enters or is very narrowly excluded from the eye. There is a narrow, curved subocular, and between this and the supraocular there are usually two small postoculars, occasionally three.

The internasals are rather large, in contact in thirty-five specimens, and in the remaining six they are separated by a single scale, a character which distinguishes this form from the closely allied *Trimeresurus stejnegeri*[1] of Fukien and Formosa.

The range of variation of the dorsal scale rows from neck to anus may be summarized as follows:

Dorsal Scale Rows	No. of Specimens
27–15	1
25–15	11
23–15	28
21–15	1

---

[1] Schmidt, 1925, Amer. Mus. Novitates, No. 157, p. 4.

Summary of Scale Counts and Measurements

	Sex	No. of Specimens	Extremes	Average
Ventrals	♂	21	153–162	158
	♀	20	158–167	161
Caudals	♂	21	65– 73	69.5
	♀	19	52– 60	56
Scales Between Supraoculars	♂	21	8– 13	11
	♀	20	9– 13	11
Upper Labials	♂	21	10– 12	10.4
	♀	20	10– 12	11.1
Lower Labials	♂	21	11– 14	12.2
	♀	20	12– 16	13.0
Total Length, mm.	♂	21	313–626	498
	♀	19	335–945	703
Tail-Length ÷ Total Length	♂	21	.18–.22	.20
	♀	19	.14–.18	.16

Seven stomachs contained the remains of mammals, three contained frogs, and one a lizard (*Calotes versicolor*).

Mell, 1922, p. 126, on the basis of extensive field observation, found the Chinese pit vipers of the *gramineus* group evidently divisible into two forms, a northern, mountain form, for which he retained the name *gramineus*, and a southern, plains form, for which he suggested the use of the name *Trimeresurus gramineus albolabris* Gray. It is evident from his description and from the range suggested by him, that it is the latter form which is common in Hainan. I find that specimens from Formosa, Fukien, and Yunnan are readily distinguishable from the Hainan form, and evidently represent Mell's *gramineus gramineus*. The examination of specimens of *gramineus* from Indo-China, Siam, Java, and India, however, proves that it is the southern form which ranges to Hainan and Canton, and that *T. albolabris* is therefore a strict synomym of *gramineus*. I have proposed names for the allied Yunnan and central Chinese species in a former paper, and hope to return in the future to a more extended discussion of their relations.

"This viper must be rated as common. At one time it was brought in often, about one specimen every other day. I have never found one myself, in spite of the fact that I was out collecting every day during the time it was being brought in so often. Perhaps it stays in the green, and perhaps it was brought in more frequently in the winter because of the scarcity of green cover. It was rarely brought in later in the season, though we continued to advertise for it.

"One of these vipers was hanging on the outside of a basket containing a python, and I unconsciously put it (the viper) in my lap. It made no attempt to strike. A viper that was quite exhausted after disgorging its meal soon recovered its activity. I found that it would snap as well as strike. When the end of a stick was placed just back of its head, its jaws snapped on it with lightning speed, the fangs obviously being brought into action. It repeated this performance several times when the stick was brought near it. When put out and worried with a piece of cloth, it still snapped viciously, but would wait until the object was quite near. It assumes the usual S shape in preparing to strike.

"A half-grown specimen disgorged a small rat; an eighteen inch specimen disgorged a lizard, probably *Calotes;* a fifteen-inch specimen disgorged two half-grown rats. A thirty-three-inch specimen had swallowed a large rat. Its diameter at the neck was half an inch, and at the place where the rat was contained, one and three-fourths inches." (C. H. P.)

LIST OF THE SPECIES OF REPTILES KNOWN FROM HAINAN

Turtles

1. *Platysternon megacephalum* (Gray)
2. *Ocadia sinensis* (Gray)
3. *Clemmys bealii* (Gray)
4. *Clemmys mutica* (Cantor)
5. *Cyclemys trifasciata* (Bell)
6. *Pyxidea mouhotii* (Gray)
7. *Amyda sinensis* (Wiegmann)
8. *Amyda steindachneri* (Siebenrock)
9. *Pelochelys cantorii* (Gray)

No endemic species of turtle is known from Hainan. Mell (1922, p. 108) lists *Testudo emys* as recorded from this island, but on what authority I am unable to discover. It seems possible that he may have misinterpreted Siebenrock's note (1906, p. 583), to which he refers. Smith (1923*a*, p. 196) also ascribes five species of turtles to Hainan, apparently following Mell. He indicates a species of turtle (not specified) as confined to Hainan, but this is doubtless *Clemmys schmackeri*, whose identity with *Clemmys mutica* of the Chinese mainland can scarcely be doubted. As in other groups of reptiles, it seems evident that the turtle fauna of Hainan is by no means exhausted with the present list.

LIZARDS

1. *Goniurosaurus lichtenfelderi* (Mocquard)
2. *Hemidactylus frenatus* Duméril and Bibron
3. *Hemidactylus garnotii* Duméril and Bibron
4. *Peropus mutilatus* Wiegmann
5. *Gekko similignum* M. A. Smith
6. *Draco whiteheadi* Boulenger
7. *Calotes versicolor* (Daudin)
8. *Acanthosaura hainanensis* Boulenger
9. *Leiolepis belli* (Gray)
10. *Varanus salvator* (Laurenti)
11. *Takydromus sexlineatus meridionalis* (Günther)
12. *Mabuya longicaudata* (Hallowell)
13. *Mabuya multifasciata* (Kuhl)
14. *Sphenomorphus indicus* (Gray)
15. *Sphenomorphus leveretti*, new species
16. *Leiolopisma reevesii* (Gray)
17. *Lygosaurus salsburyi*, new species
18. *Eumeces chinensis* (Gray)
19. *Eumeces quadrilineatus* (Blyth)
20. *Tropidophorus hainanus* M. A. Smith

Besides the two new species, the two named by Boulenger, and the two recently discovered by Dr. Malcolm A. Smith are known only from Hainan. I am convinced that *Goniurosaurus hainanensis* Barbour and *Eublepharis lichtenfelderi* Mocquard must be united. The differences discoverable in the original descriptions relate to the sex of the specimens examined or are due to different methods of description. The type locality of *E. lichtenfelderi* is the Norway Islands, across the Gulf of Tonkin from Hainan. Mr. F. Angel, of the Museum d'Histoire Naturelle in Paris, to whom I have been indebted for similar favors in the past, has kindly examined this type and has supplied me with an excellent photograph (Plate XXVII), and a figure of the scales surrounding the nostril (Text Fig. 17). The photograph, compared with Barbour's figure of *hainanensis*, proves their identity in habitus and color pattern, and the figure shows the nasal scales, which are differently described, to be in reality the same. Through the courtesy of Dr. Barbour, I was able to examine the type of *G. hainanensis* at the Museum of Comparative Zoölogy.

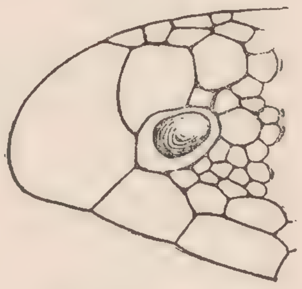

Fig. 17. Tip of snout of *Eublepharis lichtenfelderi* (type).

To show arrangement of the nasals (figured through the courtesy of M. F. Angel, Museum d'Hisoire Naturelle, Paris).

SNAKES

1. *Typhlops braminus* (Daudin)
2. *Python bivittatus* Schlegel
*3. *Sibynophis hainanensis*, new species
4. *Natrix æquifasciata* Barbour[1]
*5. *Natrix andrewsi*, new species
6. *Natrix chrysarga* (Schlegel)
7. *Natrix percarinata* (Boulenger)
8. *Natrix piscator* (Schneider)
*9. *Natrix popei*, new species
10. *Natrix stolata* (Linné)
11. *Natrix subminiata* (Schlegel)
12. *Trimerodytes balteatus* Cope
13. *Pseudoxenodon melli* Vogt
*14. *Achalinus meridianus* M. A. Smith
15. *Lycodon subcinctus* Boie
16. *Ptyas korros* (Schlegel)
17. *Ptyas mucosus* (Linné)
18. *Elaphe porphyracea* (Cantor)
19. *Elaphe tæniura vaillanti* (Mocquard)
20. *Ahaetulla boiga* (Lacépède)
*21. *Holarchus formosanus hainanensis* (Bœttger)
*22. *Holarchus nesiotis* Barbour
23. *Holarchus violaceus* (Cantor)
24. *Enhydris bennetti* (Gray)
25. *Enhydris chinensis* (Gray)
26. *Enhydris plumbea* (Boie)
27. *Boiga multimaculata* (Boie)
28. *Psammodynastes pulverulentus* (Boie)
29. *Thalassophina viperina* (Schmidt)
30. *Hydrophis cyanocinctus* (Daudin)
31. *Microcephalophis gracilis* (Shaw)
32. *Naja naja atra* (Cantor)
33. *Bungarus multicinctus* Blyth
34. *Calliophis macclellandii* (Reinhardt)
*35. *Amblycephalus carinatus hainanus* M. A. Smith
36. *Amblycephalus moellendorffii* (Bœttger)
37. *Trimeresurus gramineus* (Shaw)

The seven species marked with an asterisk in the above list are known only from Hainan. As the snake fauna of the more northern island of Formosa consists of about fifty species, it is evident that numerous additions to the above list may still be expected.

The known reptile fauna of Hainan is now brought up to a total of sixty-six species, exclusive of marine turtles.

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[1] This species is now known from the Chinese mainland.

BIBLIOGRAPHY[1]

BARBOUR, THOMAS. 1908. 'Some New Reptiles and Amphibians.' Bull. Mus. Comp. Zoöl., Cambridge, LI, pp. 313–325, text figs. 1–3.

1909. 'Notes on Amphibia and Reptilia from Eastern Asia.' Proc. New England Zoöl. Club, IV, pp. 53–78, Pls. VI–VII.

1912. 'A Contribution to the Zoögeography of the East Indian Islands.' Mem. Mus. Comp. Zoöl., XLIV, pp. 1–203, Pls. I–VIII.

BŒTTGER, OSKAR. 1888. 'Materialien zur herpetologischen Fauna von China II.' Ber. Offenbacher Ver. Naturk., XXVI–XXVIII, pp. 53–176, Pls. I–II.

1893. 'Katalog der Reptilien-Sammlung im Museum der Senckenbergischen Naturforshenden Gesellschaft in Frankfurt-am-Main, I Teil. (Rhynchocephalen, Schildkroten, Krokodile, Eidechsen, Chamæleons).' Frankfurt a. M., 8°., pp. x+140.

1894. 'Materialien zur herpetologischen Fauna von China III.' Ber. Senck. Ges., pp. 129–152, Pl. III.

1898. 'Katalog der Reptilien-Sammlung im Museum der Senckenbergischen Naturforschenden Gesellschaft in Frankfurt-am-Main. II Teil. (Schlangen).' Frankfurt a. M., 8°, pp. i-ix, 1-160.

1901. 'Aufzählung einer Liste von Reptilien und Batrachier aus Annam.' Ber. Senck. Ges., pp. 45–53.

BOULENGER, GEORGE ALBERT. 1882. 'Catalogue of the Batrachia Salientia s. Ecaudata in the Collection of the British Museum.' Second Edition. London, 8°, pp. xvi+503, text figures, Pls. I–XXX.

1885. 'Catalogue of the Lizards in the British Museum (Natural History). Second Edition.' London, 8°, I, pp. xii+436, Pls. I–XXXII.

1887. Idem, III, pp. xii+575, Pls. I–XL.

1889. 'Catalogue of the Chelonians, Rhynchocephalians and Crocodiles in the British Museum (Natural History).' London, 8°, pp. x+311, Pls. I–VI, 73 text figures.

1893. 'Catalogue of the Snakes in the British Museum (Natural History).' London, 8°, I, pp. xiii+448, text figures 1–26, Pls. I–XXVIII.

1894. Idem, II, pp. xi+382, text figures 1–25, Pls. I–XX.

1896. Idem, III, pp. xiv+727, text figures 1–37, Pls. I–XXV.

1899. 'On a Collection of Reptiles and Batrachians made by Mr. J. D. Latouche in N. W. Fokien, China.' Proc. Zoöl. Soc. London, pp. 159–172, Pls. XVI–CXIX.

1899*a*. 'On the Reptiles, Batrachians and Fishes collected by the late Mr. John Whitehead in the interior of Hainan.' Proc. Zoöl. Soc. London, 1899, pp. 956–962, Pls. LXVI–LXIX.

COPE, E. D. 1895. 'On a collection of Batrachia and Reptilia from the Island of Hainan.' Proc. Acad. Nat. Sci. Phila., (1894), pp. 423–428, Pl. x, fig. 1–2.

MELL, R. 1922. 'Beitrage zur Fauna sinica I Die Vertebraten Südchinas; Feldlisten und Feldnoten der Säuger, Vögel, Reptilien, Batrachier.' Arch. Naturg., Berlin, LXXXVIII, Abt. A, Heft 10, pp. 1–146, text fig, map, and Pls. I–IV.

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[1] Papers or works containing explicit references to the herpetological fauna of Hainan, or referred to in the course of the present studies.

MOCQUARD, F. 1897. 'Notes herpetologiques.' Bull. Mus. Hist. Nat. Paris, pp. 211–217.

PERACCA, M. G. 1904. 'Nouvelles espèces d'Ophidiens d'Asie et d'Amerique faisant partie de la collection du Museum d'Histoire Naturelle de Geneve.' Rev. Suisse Zool., XII, pp. 663–668.

POPE, CLIFFORD H. 1924. 'Hainan, an island of forbidding reputation that proved an excellent collecting ground.' Natural History, XXIV, pp. 215–223, figures.

SCHMIDT, KARL PATTERSON. 1925. 'New Reptiles and a new salamander from China.' Amer. Mus. Novitates, No. 157, pp. 1–5.

SIEBENROCK, FRIEDRICH. 1902. 'Zur Systematik der Schildkrötenfamilie Trionychidæ Bell, nebst der Beschreibung einer nenen Cyclanorbis Art.' Sitzber. Akad. Wiss. Wien (math.-natur.), CXI, Abt. 1, pp. 807–846, figures.

1903. 'Schildkröten des östlichen Hinterindien.' Idem, CXII, Abt. 1, pp. 333–352. 2 Pls.

1906. 'Zur Kenntniss der Schildkröten-fauna der Insel Hainan.' Zool. Anz., XXX, pp. 578–586, fig.

1907. 'Über einige zum Teil seltene Schildkröten aus Südchina.' Sitzber. Akad. Wiss. Wien (math.-natur.), CXVI, Abt. 1, pp. 1741–1776, Pl.

1909. 'Synopsis der rezenten Schildkröten.' Zool. Jahrb., Suppl., X, pp. 427–618.

SMITH, MALCOLM, A. 1923. 'Narrative of a Journey to the Interior of Hainan.' Journ. Nat. Hist. Soc. Siam, VI, pp. 185–194, Pls. XIII-XIV.

1923*a*. 'On a Collection of Reptiles and Batrachians from the island of Hainan.' Idem, pp. 195–212, text figures 3–4.

1923*b*. 'A Review of the Lizards of the Genus *Tropidophorus* on the Asiatic Mainland.' Proc. Zoöl. Soc. London, 1923, pp. 775–781.

1926. 'Monograph of the Sea Snakes (Hydrophiidæ).' London, 8°, pp. xx+130, 35 text figs., Pls. I–II.

STANLEY, ARTHUR. 1914. 'The Collection of Chinese Reptiles in the Shanghai Museum.' Journ. N. China Br. Roy. Asiatic Soc., XLV, pp. 21–31.

STEINDACHNER, FRANZ. 1906. 'Bemerkungen zu *Liparophis bedoti* Peracca und *Lachesis monticola* Günther.' Sitzber. Akad. Wiss. Wien, CXV, Abt. I, pp. 905–909, Pl.

STEJNEGER, LEONHARD. 1907. 'The Herpetology of Japan.' Bull. U. S. Nation. Mus. No. 58, pp. xx–577, text figures 1–409, Pls. I–XXXV.

SWINHOE, ROBERT. 1870. 'List of Reptiles and Batrachians collected in the Island of Hainan (China), with Notes.' Proc. Zoöl. Soc. London, pp. 239–241.

VOGT, THEODOR. 1914. Über die Reptilien- und Amphibienfauna der Insel Hainan.' Sitzber. Ges. Naturf. Freunde Berlin, 1913, pp. 222–229.

1922. 'Zur Reptilien- und Amphibienfauna Südchinas.' Arch. Naturg. Berlin, LXXXVIII, Abt. A., Heft 10, pp. 135–146.

WALL, F. 1903. 'A Prodromus of Snakes hitherto recorded from China, Japan, and the Loo Choo Islands; with some Notes.' Proc. Zoöl. Soc. London, pp. 84–102.

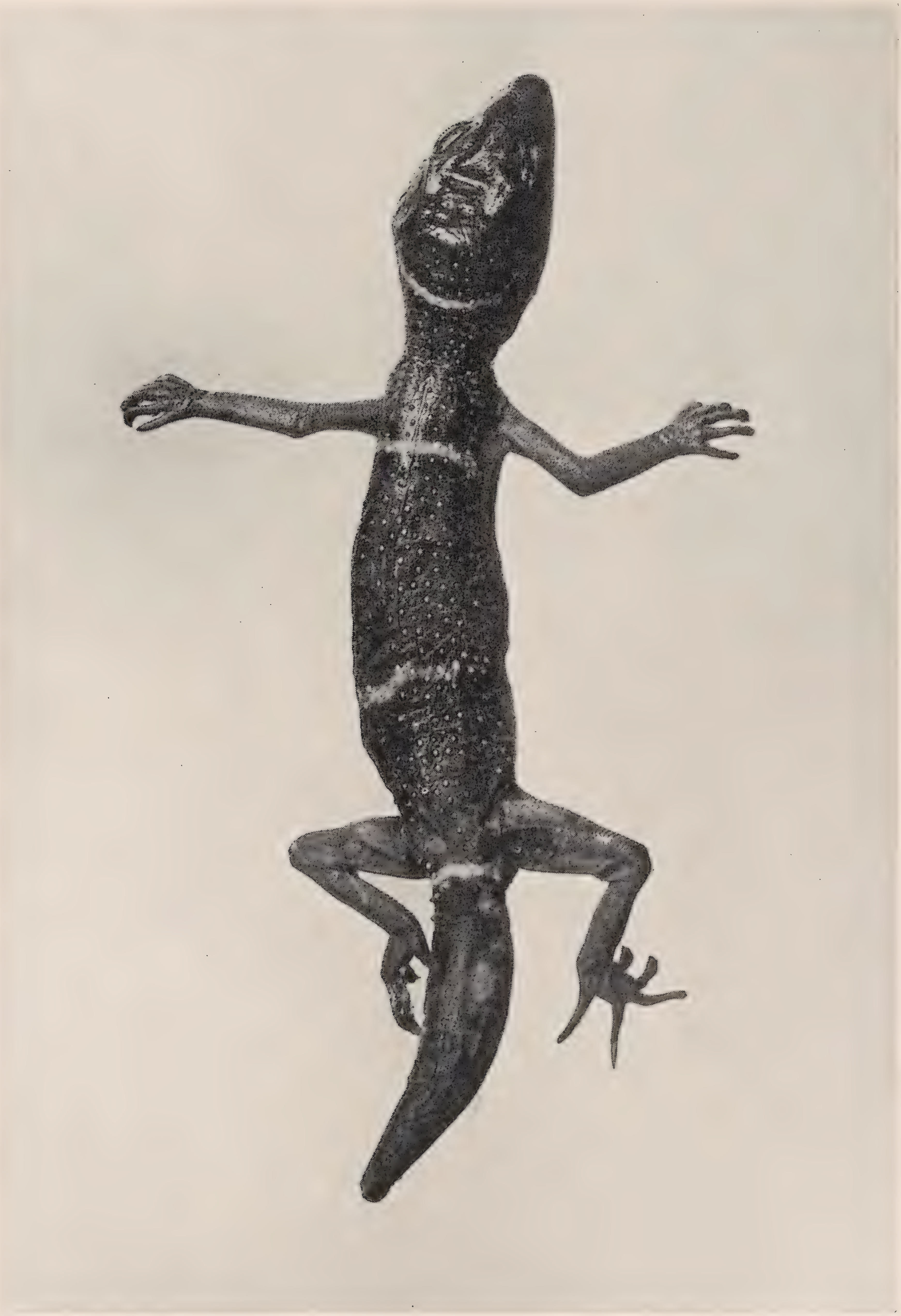
WERNER, FRANZ. 1903. 'Über Reptilien und Batrachier aus Guatemala and China in der zoologischen Staats-Sammlung in München, nebst einem Anhang über seltene Formen aus anderen Gebieten.' Abh. Bayer. Akad. Wiss., 2 kl., XXII, pp. 343–384, text figures and Pl.

1924. 'Neue oder wenig bekannte Schlangen aus dem Naturhistorischen Staatsmuseum in Wien.' Sitsber. Akad. Wiss. Wien (math.-natur.), CXXXIII, Abt. 1, pp. 29–56, text figs 1–9.

1926. 'Synonymisches über Schlangen von Hainan und vom chinesischen Festland.' Zool. Anz., LXVII, pp. 141–144.

PLATE XXVII

Dorsal view of type of *Eublepharis lichtenfelderi* (figured through the courtesy of M. F. Angel, Museum d'Histoire Naturelle de Paris).



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Article IV.—NOTES ON CHINESE REPTILES[1]

BY KARL PATTERSON SCHMIDT[2]

With Extracts from the Field Notes of Clifford H. Pope

PLATES XXVIII TO XXX, TEXT FIGURES 1 TO 22

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INTRODUCTION

The total collection of reptiles from the Chinese mainland, made by the several expeditions of The American Museum of Natural History, amounts to 1487 specimens. The principal component collections come from the provinces of Fukien and Yunnan, collected by R. C. Andrews and Edmund Heller, 1916–1917; Fukien, H. R. Caldwell, 1916–1921; Szechwan, Walter Granger, 1921; Mongolia, R. C. Andrews, 1922; and Chihli, Shansi, and Anhwei, Clifford H. Pope, 1921–1922.

A number of specimens of Chinese reptiles in The American Museum of Natural History, received as a gift from Mr. J. W. Williams, College of Yale-in-China, Changsha, Hunan, and by purchase from Rev. John Graham, Yunnanfu, Yunnan, have also been examined. These and other minor sources add fifteen species and 116 specimens. The whole collection of mainland Chinese reptiles in the American Museum includes 104 species, distributed among the following families:

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[1] Publications of the Asiatic Expeditions of The American Museum of Natural History. Contribution No. 76.

[2] Of the Field Museum of Natural History.

	No. of Genera	No. of Species	No. of Specimens
TESTUDINATA			
Testudinidæ	2	3	39
Trionychidæ	1	1	54
LORICATA			
Crocodylidæ	1	1	20
SAURIA			
Gekkonidæ	3	6	144
Agamidæ	4	10	216
Anguidæ	1	2	4
Lacertidæ	2	9	437
Scincidæ	5	11	178
SERPENTES			
Typhlopidæ	1	1	1
Colubridæ (*sens. lat.*)	20	51	437
Crotalidæ	2	9	73

The necessity for a rigid scrutinization and verification of locality records of Chinese reptiles is well shown by a small collection of snakes purchased by Mr. Pope at Wuhu, Anhwei, and a single specimen of the South Chinese *Sibynophis collaris* purchased at Hsing Lung Shan, Chihli. The Wuhu collection does not contain a single specimen of the local Anhwei fauna, but is composed of species otherwise known from Fukien, Kwangtung, and Szechwan. Mr. Pope notes that the locality records given by a Chinese vendor of such specimens will invariably be the most remote, on the theory of enhanced value, and are thus entirely untrustworthy.

Of the forty-nine species of reptiles collected by Mr. Pope in Hainan, which have already been reported upon, only thirteen are contained in the present collection, and these are forms found chiefly in southern Fukien. The faunal boundary of primary significance to Chinese herpetology seems to be the mountain ranges of northern Kwangtung and western Fukien. These are themselves important centers of evolution and differentiation, as well as highways of eastward migration from the Himalayan area.

The present studies are preliminary to a comprehensive report on the reptiles of China, to include the future as well as the existing collections of the Third Asiatic Expedition. I have accordingly no more than touched upon the highly interesting distributional problems which present themselves in this fauna. For the same reason I have omitted the synonymy of the species considered, except where quoted for a special purpose.

Through the courtesy of Dr. Thomas Barbour of the Museum of Comparative Zoölogy and of Dr. Leonhard Stejneger of the United

States National Museum, I have been able to examine Chinese specimens in their charge in connection with the collections here reported upon, and I have profited on frequent occasions by the advice of both.

My connection with the present report results from a cordial cooperative arrangement between The American Museum of Natural History and the Field Museum of Natural History, arranged at the instance of Mr. Roy Chapman Andrews, leader of the Third Asiatic Expedition. Mr. Clifford H. Pope, to whose efforts the collection of a large part of the material is due, has kindly permitted the incorporation of a part of his field notes, and I have discussed numerous questions with him in the course of the work.

List of New Forms and Type Localities[1]

Turtles	
Geoclemys grangeri	Yenchingkau, Szechwan.
Lizards	
Calotes alticristatus	Yunnanfu, Yunnan.
Eremias barbouri	Mai Tai Chao, Shansi.
Leiolopisma monticola	Likiang, Yunnan.
Leiolopisma septentrionale	Hsing Lung Shan, Chihli.
Snakes	
Natrix helleri	Tengyueh, Yunnan.
Natrix nivalis	Likiang, Yunnan.
Natrix septemlineata	Tengyueh, Yunnan.
Dinodon rufozonatum williamsi	Changsha, Hunan.
Elaphe bimaculata	Ningkwo, Anhwei.
Elaphe osborni	Tengyueh, Yunnan.
Elaphe porphyracea pulchra	Yunnanfu, Yunnan.
Gonyosoma caldwelli	Yenping, Fukien.
Boiga sinensis	Fukien Province.
Trimeresurus orientalis	Shaowu, Fukien.
Trimeresurus stejnegeri	Shaowu, Fukien.
Trimeresurus yunnanensis	Tengyueh, Yunnan.

ANNOTATED LIST OF SPECIES

TESTUDINATA

Clemmys mutica (Cantor)

Emys mutica Cantor, 1842, Ann. Nat. Hist., IX, p. 482.

Damonia mutica Boulenger, 1889, 'Cat. Chelon, Brit. Mus.,' p. 96.

Clemmys schmackeri Bœttger, 1894, Ber. Senck. Ges., p. 129, Pl. iii, fig. 1.

Clemmys nigricans Siebenrock, 1903, Sitzber. Akad. Wiss. Wien (math.-natur.), CXII, Abt. 1, p. 439.

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[1] Diagnoses of these species have appeared in Amer. Mus. Novitates, No. 157, February 13, 1925, and No. 175, May 28, 1925.

Clemmys mutica SIEBENROCK, 1910, Ann. Naturh. Hofmus. Wien, XXIII, p. 312, Pl. I–II.

The above synonymy supplies the key to the further bibliography of this species and presents the principal mutations in its name. It still appears as "*Damonia*" in Mell's list of Kwangtung species, but was not taken by him, unless it is included with the *Clemmys nigricans* of his report.

A single female specimen, A. M. N. H. No. 31065, was collected by Mr. Clifford H. Pope at Ningkwo, Anhwei Province, Sept.-Oct. 1921.

While this specimen presents some variations in general appearance from the Hainan series collected by Mr. Pope, there is no important difference discoverable. Ningpo and Ningkwo are the most northern records of this species, and a good series of it from that area is a desideratum.

The measurements of the present specimen are as follows:

Length of Carapace	137 mm.
Breadth of Carapace	98
Depth	56
Length of Plastron	114
Breadth of Plastron	71

Geoclemys reevesii (Gray)

Thirty-five specimens of this species are in the collection of The American Museum of Natural History. A. M. N. H. Nos. 17415 and 17417–17420 were collected at Changsha, Hunan, August 1920, by Mr. J. W. Williams; No. 23518 is from Yocow, Hunan, collected December 1921–March 1922, by Mr. Clifford H. Pope; and Nos. 31093–31120 are from Ningkwo, Anhwei Province, September–October 1921, collected by Clifford H. Pope.

Three specimens present the melanistic phase, which is known as var. *unicolor*, of this species; these have no trace of markings on head and neck, as well as a uniformly black shell. Other specimens, with a very dark shell, retain traces of the neck markings. It seems evident that this color variety is co-extensive in range with the parent species.

Measurements of ten specimens of the Ningkwo series are as follows:

A. M. N. H. No.	SEX	LENGTH CARAPACE	BREADTH CARAPACE	DEPTH	LENGTH PLASTRON	BREADTH PLASTRON
31093	juv.	39 mm.	30 mm.	19 mm.	33 mm.	25 mm.
31095	juv.	52	42	25	45	33
31100	♂	63	46	29	53	38
31109	♀	74	55	34	68	47
31096	♂	85	60	37	74	50
31120	♂	94	65	44	79	54
31119	♀	104	68	46	89	57
31115	♀	117	81	55	109	71
31116	♀	131	87	57	116	72
31117	♀	154	100	72	133	87
Average of 5 Juv.		47	38	24	42	31
Average of 13	♂	75	53	34	64	44
Average of 15	♀	103	72	47	92	61

"The three-ridged, hard-shelled turtle is never taken by the fishermen, who constantly catch the soft-shelled turtles. I have seen them dropping into the water from inclined logs on the bank." (C. H. P.)

Geoclemys grangeri, new species

Figures 1 and 2

Geoclemmys reevesi VOGT, 1924, Zool. Anz., LX, p. 337 [?]. WERNER, 1924, Denkschr. Akad. Wiss. Wien (math.-natur.), XCIX, p. 40 [?].

TYPE.—A. M. N. H. No. 23481; ♂; Yenchingkao, Wanhsien, Szechwan, 1500 ft. alt.; November, 1921; Walter Granger.

DIAGNOSIS.—Differs from *Geoclemys reevesii* in having the axillary shield larger than the inguinal; the small occipital shields much smaller; and the spots of the plastral shields much smaller and more sharply defined. The gular suture is more than twice that of the humerals; the first marginal is the broadest; and the bridge is a little longer than the posterior lobe of the plastron.

DESCRIPTION OF TYPE.—Snout rather pointed, strongly projecting, vertical profile oblique; edges of jaws smooth, the upper without median notch or hook; head covered with a large smooth shield, behind which are very small scale-like areas on the skin, merging gradually into the rugose skin of the neck; carapace nearly uniform oval as seen from above, the lateral profile uniformly rounded, the greatest depth at about the middle of the shell; carapace with three well-defined keels; lateral marginals with turned up edges; first marginal broadest; plastron very slightly concave, strongly notched behind, the femorals projecting laterally; axillary shield larger than the inguinal; bridge a little longer than the posterior lobe of the plastron, (measured to the points of the anals).

Dorsal shields brown, lightest on the lateral keels, margined with dark lines which define the light lines of the sutures very sharply; a yellow spot on the edges of the five most posterior marginals on each side; plastron yellow, with a black spot on each shield, each nearly as long and about half as wide as the shield; a pair of lateral

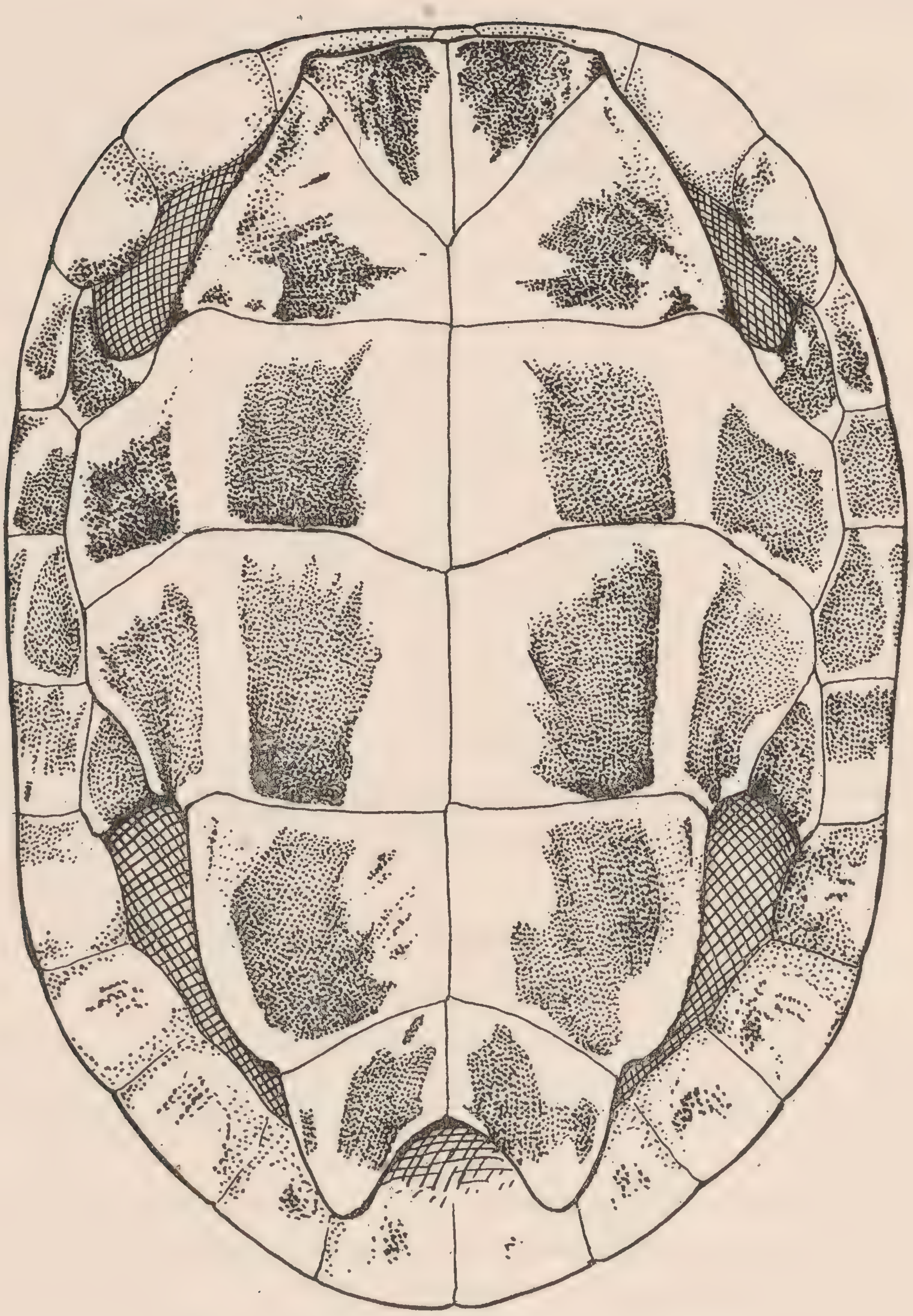

Fig. 1. *Geoclemys grangeri,* new species.
Plastron of type, natural size.

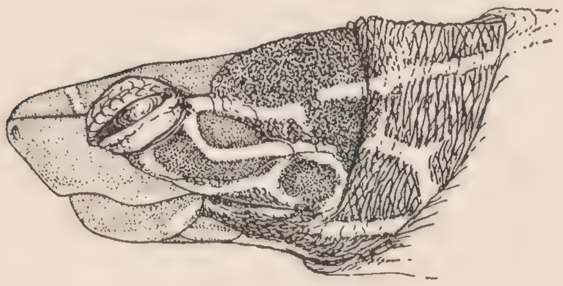

Fig. 2. *Geoclemys grangeri,* new species.
Head pattern of type, natural size.

spots on each bridge, one on each axillary and inguinal shield, and a diffuse spot on the lower parts of the lateral marginals.

Neck with a median, a dorsolateral, and two lateral light lines; spotted beneath; pattern of the head as in *reevesii*, its chief elements a stirrup-shaped mark on the chin, a sinuous line from the posterior corner of the eye over the ear to the lateroventral line on the neck, a more nearly horizontal line above this, and an irregular line a little behind the ear, from the dorsolateral line to the lateroventral; a faint line from the lower border of the eye to the ear, where it may end in a fork; limbs without markings.

The measurements of the shell and the plastral sutures are as follows:

Length of Carapace	108 mm.
Breadth of Carapace	74
Depth	45
Length of Plastron	91
Breadth of Plastron	61
Gular Suture	18
Humeral Suture	6.5
Pectoral Suture	21
Adbominal Suture	20
Femoral Suture	16
Anal Suture	10

As the present form is unfortunately based on a single specimen, its status requires verification. Should it prove valid, the "*Geoclemmys reevesi*" recorded from Chengtu, Szechwan, by Vogt, should be referable to it, and possibly also the Yunnanfu specimen recorded by Werner.

Trionychidæ

Amyda tuberculata (Cantor)

Trionyx tuberculatus CANTOR, 1842, Ann. Mag. Nat. Hist., (1) IX, p. 482.

Amyda sinensis STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 524. BARBOUR, 1909, Proc. New England Zoöl. Club, IV, p. 77. STEJNEGER, 1910, Proc. U. S. Nation. Mus., XXXVIII, p. 114. WANDOLLECK, 1910, Zool. Anz. XXXV, p. 566, fig. 1–3. BARBOUR, 1912, Mem. Mus. Comp. Zoöl., XL, p. 135.

Trionyx sinensis (part) SIEBENROCK, 1907, Sitzber. Akad. Wiss. Wien (math.-natur.), CXVI, Abt. 1, p. 1768; 1909, Zool. Jahrb., Suppl., X, p. 601.

Amyda schlegelii STEJNEGER, 1907, Bull. U. S. Nation. Mus., No. 58, p. 526, fig. 407–409.

The status of the Chinese soft-shelled turtles of the allied forms which Boulenger unites as *Trionyx sinensis* has been a subject of discussion since Dr. Stejneger, in his 'Herpetology of Japan' suggested their separation into several distinct forms, as follows:

1.—A Japanese form	*A. japonica*
2.—An Amur River form	*A. maackii*
3.—A North Chinese form	*A. schlegelii*
4.—A South Chinese form	*A. sinensis*

This subdivision was proposed as a very tentative one, and it elicited criticism from Siebenrock and Wandolleck. Stejneger himself, in 1910, regards two specimens from Honan as indistinguishable from Japanese specimens. Siebenrock, in 1907, examined a series of fourteen specimens from the Chinese mainland, and compared them with Japanese, Formosan, and Hainan specimens, with reference only to the characters of the median keel and of the carapacial tubercles, which had been employed by Stejneger. It seems obvious that many more characters must be examined in detail before reaching a conclusion on this problem.

In the fifty-eight specimens before me, which are rather well distributed from Mongolia to Hainan, the variation in form of shell is bewildering, so much so that I am convinced that the solution of the problem rests with the accumulation of still more extensive series.

The Chinese specimens in the collection of The American Museum of Natural History are the following: A. M. N. H. No. 17416, Changsha, Hunan, August 1920, J. W. Williams; Nos. 23514–23517, 23519-23520, Yochow, Hunan, December 1821-March 1923, Clifford H. Pope; Nos. 21464–21468, Hsing Lung Shan, Eastern Tombs, Chihli, August 1st–14th, 1921, Clifford H. Pope; No. 31066, Peking, Chihli, (bought in market), 1921, Clifford H. Pope; No. 23480, Chun Chow, Szechwan December 1921, Walter Granger; Nos. 23484–23487, Fukien Province, H. R. Caldwell; No. 31518, Yenping, Fukien, 1921, H. R. Caldwell; Nos. 23482–23483, and 31067–31080, Ningkwo, Anhwei, September–October, 1921, Clifford H. Pope; No. 24719, Niangtzekwan, Shansi, September 15 1922, Clifford H. Pope; Nos 31081–31092, Chen Tzu, Taiyuan, Shansi, July–August, 1922, Clifford H. Pope; and Nos. 23914–23919, Paotowchen, Mongolia, May, 1922, Clifford H. Pope.

The numbers of specimens in geographically comparable series are as follows:

Chihli	6
Shansi	13
Mongolia	6
Anhwei	16
Hunan	7
Szechwan	1
Fukien	5

Besides these, four specimens from Nodoa, Hainan, which have been noticed in a previous paper in this series of reports, have been at hand.

The primary division in this entire series seems to be plainly between the Hainan specimens and those of the Chinese mainland from Fukien north. The Hainan specimens are broader when adult (over 200 mm. in length of carapace); their greatest breadth is anterior to the middle of the carapace; and the ventral pattern is more vivid, apparently more constant, and more persistent with increasing age, than is the case in the northern specimens. As the type locality of *A. sinensis* is Macao, there can be little doubt of the correctness of referring these Hainan specimens to *sinensis s.s.* A much larger series of this form is required to establish the limits of variation of this form, and its range to the north is quite unknown.

Reserving provisionally the name *japonica* for the Japanese turtles, the next available name for the turtles of northern China is *Amyda tuberculata* (Cantor). The type locality of this species is Chusan, which seems geographically satisfactory for the Yangtze Valley form; and for the present material it seems best to employ no other name.

The series from Fukien consists of two juvenile specimens, a medium-sized one, and two of 166 and 174 mm. respectively. There is no ventral pattern in these specimens.

The Szechwan specimen is a monstrosity of the type figured by Mell and named "*cyphus*" by Vogt. There are no ventral markings. Its depth of shell is 0.37 of the length of the plastron.

The Hunan specimens are small, the largest measuring only 108 mm., and therefore are unsatisfactory for the comparison of measurements with adults which, as far as I am able to determine, are less variable than the juvenile specimens. There is no plastral pattern except the markings on the soft parts. The specimen from Changsha, 108 mm. in length of plastron, is relatively broad and its breadth is anterior. In this respect it is decidedly the closest approach to the Hainan specimens in the whole northern series.

The Anhwei series consists of two adult males of 182 and 193 mm., three medium-sized, and eleven juvenile specimens. In the latter the plastral pattern is well-marked in two specimens, four specimens have a reduced pattern of from one to four spots, and five have no pattern except for the lateral spots. In the three larger specimens the breadth of carapace varies from 0.75 to 0.79 of its length.

The six specimens from Chihli should be referable to *A. schlegelii* but I have not been able to find characters to separate them from the Anhwei or from Fukien specimens of similar size. Their depth of shell ranges only from 0.23 to 0.26 of the length of the carapace.

The Shansi series ranges in size from 62 mm. to 140 mm., and is thus without either juvenile or fully adult specimens. Only one specimen has a plastral pattern.

The six male specimens from the Hwang Ho near Paotowchen, Mongolia, north of Ordos, range in size from 217 to 275 mm. This series is the most distinct of those examined, with a narrow carapace, a short plastron, and the least depth of shell. Neither these nor the Hsing Lung Shan specimens correspond with Stejneger's deep-bodied *schlegelii*, and I suspect that, even if *schlegelii* should prove recognizable, other characters will have to be chosen to distinguish it.

On account of the very important variation in proportions with age, it is essential to compare specimens of approximately equal size. The present series is accordingly wholly inadequate for the solution of what may be called the "*sinensis*" problem, and the present remarks are preliminary to a more extended study when additional specimens become available.

LORICATA

Crocodylidæ

Alligator sinensis Fauvel

Alligator sinensis FAUVEL, 1879, Journ. N. China Branch Roy. Asiatic Soc., XIII, p. 1, figs. VAILLANT, 1880, Ann. Sci. Nat., (6) IX, Art. 8. BŒTTGER, 1885, Ber. Offenbacher Ver. Naturk., XXIV–XXV, p. 25 (of reprint); 1888, idem, XXVI–XXVIII, p. 111. GÜNTHER, 1889, Ann. Mag. Nat. Hist., (6) IV, p. 219. BOULENGER, 1889, 'Cat. Chelon. Brit. Mus.,' p. 291; 1890, Proc. Zoöl. Soc. London, p. 619, Pl. LI–LII. BŒTTGER, 1893, 'Kat. Rept. Mus. Senck.,' I, p. 19; 1894, Ber. Senck., Ges. p. 142. GADOW, 1901, 'Amphibia and Reptiles,' p. 471. WERNER, 1903, Abh. Bayer. Akad. Wiss., 2 Kl., XXII, p. 360. COHN, 1908, Jahrb. Samml. Bremen, I, part 2, p. 1, Pl. I. BARBOUR, 1910, Proc. Acad. Nat. Sci. Phila., 1910, p. 464. WERNER 1912, 'Die Lurche und Kriechtiere,' I, p. 548, Pl. BOULENGER, 1914, 'Reptilia and Batrachia,' p. 45, Pl. STANLEY, 1914, Journ. N. China Branch Roy. Asiatic Soc., XLV, p. 22. BARBOUR, 1922, Proc. New England Zoöl. Club, VIII, p. 31. MOOK, 1923, Bull. Amer. Mus. Nat. Hist., XLVIII, p. 553, figs. 1–2. STEJNEGER, 1925, Proc. U. S. Nation. Mus., LXVI, p. 34, Art. 25.

Twenty specimens of this species were secured by Mr. Pope. Of these, A. M. N. H. Nos. 23899–23901 are prepared as skulls, 28690–28692 are alcoholic specimens, and 28681–28689, 28693–28696 are dry skins with complete skeletons.

The Chinese alligators collected by Mr. Pope have been noticed in a paper on the skull of this form by Dr. C. C. Mook (1923). The species is included here to complete the series of reports on the reptiles and to record Mr. Pope's interesting field notes, which, it is hoped, he may amplify on a future occasion.

"I bought nineteen alligators in all for $19.60. There are apparently no very small ones now, or else the small ones are more difficult to obtain. My smallest specimens are about two feet long.

"These alligators were dug out of holes in a grassy plain by the side of the Ching Ssui Ho, the river that flows from the south through Wuhu and into the Yangtze. This plain is about seven miles up-stream from Wuhu, and is well known to the Chinese as the home of a numerous colony of alligators. The plain is treeless, and even the grass is sparse. At this time of year the river flows between steep banks, perhaps twenty-five feet high In the fall, at flood time, the Yangtze backs up until the plain above these banks is flooded. This is perhaps the reason why the plain where the alligators are found is not cultivated.

"The Chinese say that there are two other colonies within a few miles, and these three are apparently the only ones in this region.

"The alligators are very numerous at this locality. The entire lot was dug up in less than a week, and the supply appeared to be unlimited. The holes in which they are found are about a foot in diameter at the mouth, and seem to run in at an angle to a depth of about five feet.

"At this time the alligators are still hibernating and are quite inert when dug out, so that they may be handled quite freely. They will not use their tails in defense, though some of them will 'roar' and bite a little. If put on the ground, they will not attempt to run and have to be teased to become at all aroused. It was interesting to find a wild cat in the same mound, probably in the same hole, with a large alligator." (C. H. P.)

SAURIA

Gekkonidæ

Gekko japonicus (Duméril and Bibron)

Thirty-four specimens, from three localities, are referable to this species: A. M. N. H. No. 23585, Yenping, Fukien, 1921, H. R. Caldwell; and 31121, Kolan, Shansi, summer, 1922, and 31122–31135, 31137–31153, 31202, Ningkwo, Anhwei, September–October, 1921, Clifford H. Pope. Five specimens, collected by J. W. Williams at Changsha, Hunan, July, 1920, and presented to the American Museum, have also been examined.

These specimens agree in the presence of distinct dorsal tubercles, which amply distinguish the species. It is surprising to find an unquestionable specimen of this species from Shansi, from which province Mr. Pope secured large numbers of *G. swinhonis;* and the single specimen from Yenping, Fukien, was associated with *G. subpalmatus.* The preanal pores of the males of this series range from five to eight, eight occurring once, seven four times, six seven times, and five once.

The variation in the arrangement of the postmentals is of interest in comparison with that of *swinhonis*. The median pair of postmentals extends normally as far as or farther than the lateral pair. One or both of the first pair may be transversely divided, and No. 31121 has a median postmental. The enlarged scales which border the median pair vary in number from two to six, distributed as follows:

Scales Bordering Postmentals	Number of Specimens
2	2
3	9
4	12
5	9
6	5

Gekko swinhonis Günther

Eighty-three specimens represent this species: A. M. N. H. Nos. 21340–21342, 21344–21373, Hsing Lung Shan, Chihli, August, 1921; 31136 and 31434, So Huang, Ping Ting, Shansi, September, 1922; and 31154–31201, Chen Tzu, Taiyuan, Shansi, July–August, 1922, all collected by Clifford H. Pope.

The two specimens from So Huang, Ping Ting differ from the others in lacking entirely the slightly enlarged scales which are scattered among the otherwise uniform dorsal granular scales of the Chen Tzu and Chihli series. A series of specimens from So Huang is a desideratum.

The number of preanal pores and the arrangement of the second row of postmentals contrasts with these characters in *G. japonicus*. They vary as follows:

Number of Preanal Pores	Number of Specimens
6	5
7	6
8	7
9	3

Scales Bordering Postmentals	Number of Specimens
2	39
3	28
4	15
5	0
6	1

Gekko subpalmatus Günther

Four specimens are referable to this species: A. M. N. H. Nos. 18611, 20990, Yenping, Fukien, August, 1916, R. C. Andrews and Edmund Heller; 23586; Fukien Province (doubtless near Yenping), 1921, H. R. Caldwell; and 23608, Wanhsien, Szechwan, December, 1921, Walter Granger.

The palmation of the digits is rather variable, and reaches a maximum in No. 23608, which may be said to have the toes nearly half webbed. The scales bordering the postmentals posteriorly are two or three in number. The single male specimen has ten preanal pores.

Gekko gekko (Linnæus)

Four specimens of this species in the American Museum collections were sent by Mr. John Graham from Yunnanfu, but it is possible that they actually come from Tonkin. A specimen of *Hemidactylus frenatus*, also from Mr. Graham, was labeled Hanoi, Tonkin.

Hemidactylus bowringii (Gray)

A single specimen, collected by Mr. Graham at Yunnanfu, October 20, 1920, respresents this species. It agrees closely with a Field Museum specimen from Lilong, Canton, Kwangtung, received from the Basel Museum.

Cainodactylus yunnanensis (Boulenger)

Thirteen specimens of this species in the American Museum's collections have been examined. All come from Yunnanfu, Yunnan, the type locality. They are in excellent agreement with Barbour's recent redescription (1924, p. 134). The femoral pores in five male specimens vary from 15 to 23.

Agamidæ

Acanthosaura dymondi Boulenger

A single topotypic specimen, A. M. N. H. No. 12802, collected in the Wutingchow district, Yunnan, May 3, 1919, by John Graham, is in the collection. It has 7–8 upper labials; lower labials 8–8; total length 172 mm.; tail 113 mm.; arm 26 mm., and leg 38 mm.

Acanthosaura kakhienensis (Anderson)

Seventeen specimens, A. M. N. H. Nos. 19881–19887 and 20970–20979, were collected at Tengyueh, Yunnan, May, 1917, by R. C. Andrews and Edmund Heller.

This form is well characterized by its distinct vertical patches of enlarged lateral scales. It is excellently figured by Boulenger (1887*a*, Pl. vi, fig. 2) as *Calotes feæ*.

Summary of Scale Characters and Measurements

	SEX	NUMBER OF SPECIMENS	EXTREMES	AVERAGE
Upper Labials	♂+♀	17	6– 8	6.5
Lower Labials	♂+♀	17	6– 8	7.0
Total Length	♂+♀	15	193–258 mm.	234 mm.
Length of Body	♂+♀	17	73– 97	87
Hind Leg/Body Length	♂+♀	17	.51–.63	.58
Tail/Total Length	♂+♀	15	.60–.64	.62

Acanthosaura lamnidentata Boulenger

Seven specimens, A. M. N. H. Nos. 19867–19869, 18609, and 23605–23607, collected by H. R. Caldwell, 1917–1921, near Yenping, Fukien.

The upper labials in this series range from 10 to 13. The tail length varies from 0.59 to 0.64 of the total.

Acanthosaura varcoæ Boulenger

A single specimen, A. M. N. H. No. 18880, ♀, collected at Snow Mountain Village, 9000 feet altitude, Likiang, Yunnan, November, 1916, by R. C. Andrews and Edmund Heller Five topotypes, in the American Museum collection, have been available for comparison.

The nearest relative of this form appears to be *Acanthosaura tricarinata*, from which it is well distinguished by the presence of two distinct rows of keeled scales on each side of the dorsal crest. In the Likiang specimen the upper labials are 7–8; the lower labials 6–8. The total length is 175 mm.; tail 108 mm.; body 67 mm.; arm 31 mm.; and leg 42 mm.

This specimen was associated with *Japalura flaviceps*, from which it is almost indistinguishable in habitus. Werner's record of *dymondi* from Likiang (1924, p. 40), may possibly belong with this form.

Japalura flaviceps Barbour and Dunn

The two specimens in the collection, A. M. N. H. Nos. 19878, Likiang, Yunnan, and 19879, Snow Mountain Village, Likiang, Yunnan, collected by R. C. Andrews and Edmund Heller, November, 1916, are paratypes of this form (Barbour and Dunn, 1919, p. 16).

Measurements and labials of these two specimens are as follows:

A. M. N. H. No.	19878	19879
Sex	♀	♂
Upper Labials	8–9	7–7
Lower Labials	9–10	9–9
Total Length	148 mm.	116 mm.
Length of Body	60	48
Length of Arm	26	22
Length of Leg	42	30
Tail/Total Length	.59	.59

Werner, 1924, p. 41, refers a specimen of a *Japalura* from Likiang, Yunnan, to *yunnanensis*, with a remark on the difficulty of distinguishing *flaviceps* and *splendida*. This difficulty must be due to the lack of genuine *yunnanensis* in his material, for I find them entirely distinct. In *flaviceps* there is a strong suggestion of a pair of dorsolateral rows of keeled scales, much like those of *Acanthosaura varcoæ;* the lateral scales are small, nearly uniform, with a few rather isolated enlarged scales. All of the upper head scales are keeled, while in *yunnanensis* they are rugose or many-keeled. The latter has much larger laterals, with more numerous enlarged scales, which tend to form transverse rows, suggesting *A. kakhienensis*. It seems possible that *Japalura* is a "polyphyletic genus" whose different sections are derived from different sections of *Acanthosaura*. There is apparently a correlation of concealed tympanum with occurrence at high altitudes, which presents a problem meriting extended study and observation. *Japalura splendida* is so distinct in habitus, head form, and coloration from the above species, that it requires no comparison with them.

Japalura splendida Barbour and Dunn

Plate XXIX, Figure 2

Eighteen specimens, A. M. N. H. Nos. 23543–23549, 23551–23553, 23558–23565, from Yenchingkau, 1500 feet altitude, Wanhsien, Szechwan, November, 1921, collected by Walter Granger.

This very strikingly colored form is apparently abundant in central Szechwan. The variation in number of labials is as follows:

NUMBER OF LABIALS	UPPER LABIALS No. COUNTS	LOWER LABIALS No. COUNTS
7	5	0
8	26	25
9	5	8
10	0	3

The range of measurements is as follows:

	SEX	NO. OF SPECIMENS	EXTREMES
Length of Body	♂	15	50– 89 mm.
Length Leg Body/Length	♂	15	.80–.92
Total Length	♂	15	163–256 mm.
Length Tail/Total Length	♂	15	.65–.71

The color-pattern of a juvenile female (57 mm. body length) closely approaches that of *Japalura flaviceps*. In a larger female (77 mm. body) the pattern of transverse dark dorsal markings is included between broad light dorsolateral bands. In the smallest male specimen (50 mm. body) the more "contrasty" male pattern is already well developed.

Japalura yunnanensis Anderson

Seven specimens from Yunnan, A. M. N. H. Nos. 19871–19874, 19876–19877 Tengyueh, May, 1917, and 19875, Homushu Pass, April 2, 1917, collected by R. C. Andrews and Edmund Heller.

This series has been mentioned by Barbour and Dunn (1919). The Tengyueh specimens are topotypes.

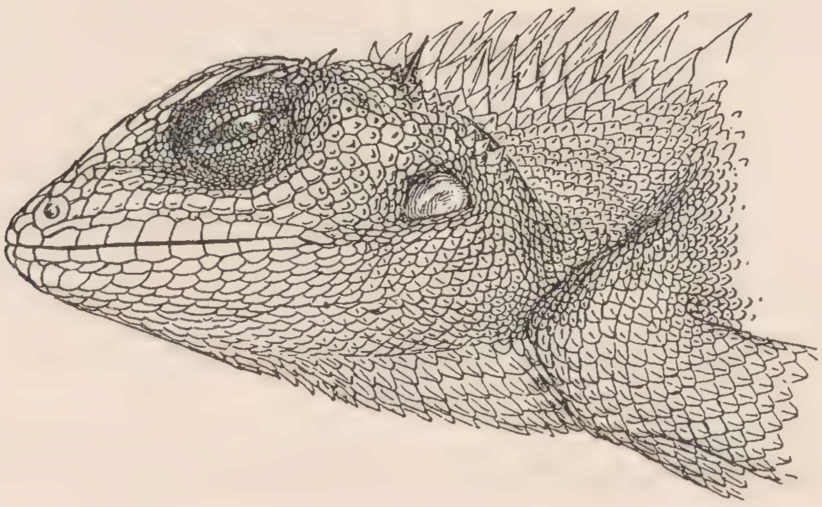

Fig. 3. *Calotes alticristatus*, new species.
Head of type from the side, natural size.

Calotes alticristatus, new species

Figure 3

TYPE.—A. M. N. H. No. 17395; ♀; Yunnanfu, Yunnan; 1919; John Graham.

DIAGNOSIS.—Closely allied to *Calotes emma*, from which it is distinguished by the following characters: (1) a greater number of scales around the body; (2) smaller postcanthal and nuchal spines; (3) a much longer nuchal crest; (4) larger tympanum; (5) no dorsolateral light line.

DESCRIPTION OF TYPE.—Body stout, slightly compressed, head large, limbs and tail long.

Upper head scales imbricate, keeled, sixteen between the supraciliary borders above the eyes; supraoculars slightly enlarged; ten scales on the canthal and supraciliary border; a small spine just behind this series; two groups of spines on each side between the tympanum and the nuchal crest, the longest about half the diameter of the tympanum; upper labials 9–11, lower labials 9–9 dorsal scales keeled, slightly larger than the ventrals, 65 around the body; keels directed upward and backward on the upper half of the body; a strong oblique fold on each side in front of the shoulder covering an area of granular scales; ventrals strongly keeled, largest on the longitudinal gular fold; nuchal crest of eighteen flattened spines, gradually merging into the low dorsal crest, the longest spines 7 mm.

General color olive-green, with about seven transverse dark dorsal bands reaching halfway down the sides; fold on side of neck black; eye with radiating black lines, one extending to the tympanum.

Measurements as follows:

Total Length	407 mm.
Body	113
Tail	294
Arm	56
Leg	85
Snout to Posterior Border of Tympanum	30
Horizontal Diameter of Tympanum	5

I was at first inclined to identify the above specimen as *Calotes yunnanensis* Annandale, whose type locality is Tengyueh. It seems to be distinguished from *yunnanensis* by the greater number of scales around the body, and probably by a difference in the fold in front of the shoulder. It may be remarked that there are remarkably few species whose range includes both Tengyueh and Yunnanfu.

Phrynocephalus frontalis Strauch

A. M. N. H. Nos. 23944–23954, 23956–23991, 23993–23999, 24001-24042, 28350 and 31235, collected at Mai Tai Chao (43 miles E. of Paotowchen), Shansi, May, 1922, by Clifford H. Pope.

The *Phrynocephalus* of northern Shansi are readily distinguished from our Mongolian specimens by the small size of their supraocular scales, which number from 25 to 35, average 29.5, across the top of the head, in twenty specimens.

The final identification of species in this genus will require a large amount of material from typical localities, as well as an exhaustive study of Bedriaga's revision (cf. Stejneger, 1925*a*, p. 41).

"While crossing the sandy plain east of Sa Hsien (April 26) we found many of the little sand-lizards, which were abundant in the more sandy spots. They scooted in every direction from beneath our feet. Many dodged into holes, but we chased others until we caught them; they attempted to escape by short dashes, and after a minute or two of persistent pursuit were tired out so that they could be picked up. The large ones were hard to catch.

"When chased in loose sand, one of these lizards would frequently stop and by rapid wriggling of the body cause himself to sink into the sand until almost out of sight. In this position his coloration was a perfect match for the sand. I did not see one go completely beneath the surface.

"A more puzzling habit was frequently observed. While being pursued the lizard would come to a full stop, erect his tail to the perpendicular, and then roll it up and down over his back two or three times. After another short dash, this performance would be repeated.

"Even when rocks were numerous and readily available as hiding places, this species rarely made use of them. Many individuals, stationed in front of their burrows, would dive into them at the first sight of danger. Others would refuse to be chased into their holes, but made repeated short dashes away from the pursuer, making circuits so as to return to their original positions beside their burrows.

"The openings of the burrows were somewhat crescentic, about five times as wide as high. The eight burrows examined ranged from four to eight inches in vertical depth, with a horizontal length of from eight to twelve inches." (C H. P.)

Phrynocephalus cf. **versicolor** Strauch

A. M. N. H. Nos. 31239–31254, collected between Pang Kiang and Iren Dabasu, summer, 1922, by R. C. Andrews.

A. M. N H. Nos. 31236–31238, 260 miles S.E. of Sairusu on the Kalgan Trail, and 31255–31294, Tsagan Nor, Gobi Desert, collected in the summer of 1922 by R. C. Andrews.

The Pangkiang and Tsagan Nor series offer slight differences, but in the present status of the genus it does not seem profitable to emphasize them. These differences, as well as the contrast between the Mongolian and Shansi specimens, appear in the attached tabular summary of characters.

Tabulation of Characters of *Phrynocephalis frontalis* and *P. versicolor*

		Upper Labials			Rows of Scales Between Eye and Labials			Scales in a Row Across Top of Head			Total Length mm.			Length Leg/Body			Tail/Total Length		
	Sex	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean
Phrynocephalus frontalis	♂	10	12–18	15.0	10	3–5	3.8	10	25–36	29.5	10	102–123	111	10	.71–.83	.79	10	.52–.57	.55
(Northern Shansi)	♀	10			10			10			10	97–118	109	10	.71–.82	.74	10	.52–.55	.54
Phrynocephalus versicolor	♂	11	12–16	13.4	11	3–4	3.7	11	18–24	21	10	107–119	113	11	.74–.83	.75	10	.54–.58	.56
Pangkiang, Mongolia	♀	5			5			5			5	105–110	107	5	.67–.78	.72	5	.50–.54	.52
Tsagan Nor, Mongolia	♂	10	13–17	14.8	10	3–5	4.2	10	18–23	21	9	106–124	114	10	.76–.86	.81	9	.55–.58	.56
	♀	10			10			10			10	104–116	109	10	.67–.80	.74	10	.52–.56	.54

Anguidæ

Ophisaurus harti Boulenger

The single specimen, A. M. N. H. No. 20981, comes from Shaowu, Fukien, collected by H. R. Caldwell, 1916.

This specimen agrees exactly with Boulenger's description and figure (1899, p. 160, Pl. xvi) except in having 114 transverse rows of dorsal scales. It is not at all like his specimens in coloration. The general dorsal color is pale brown, the ventral color pale yellowish gray; scattered small dark spots are present on the head and chin, less marked on the back, and more pronounced on the tail; a dorsolateral brown line on the posterior third of the body, extending to the tip of the tail.

Ophisaurus gracilis (Gray)

Three specimens from Yunnanfu, A. M. N. H. Nos. 20980, 22700, 22701, collected by the Rev. Graham, have three scales in a line between the prefrontal and the rostral, and are thus referable to *O. gracilis* rather than to *O. harti.*

Lacertidæ

Takydromus amurensis Peters

A. M. N. H. No. 8910, Mukden, Manchuria, collected by M. Nishimura, August, 1913, represents this species. It has five pairs of chin shields and three femoral pores on each side.

Takydromus wolteri Fischer

Ninety-seven specimens of this form are in the collection, from the following localities: A. M. N. H. No. 23625, Fukien Province, H. R. Caldwell; 23624, 23626–23634, Wanhsien, Szechwan, 1921, Walter Granger; and 31307–31312, 31314–31316, 31318–31319, 31321–31361, 31363–31378, 31380–31388, 31390–31393, 31395, 31397–31400 from Ningkwo; September–October, 1921; C. H. Pope.

In the sixty Ningkwo specimens examined, the dorsal rows of enlarged scales number 7 in four specimens, 8 in fifty-three, and 9 in three. The ventrals are uniformly in 8 rows, with two to four rows of enlarged, keeled laterals adjacent to them on each side. The chin-shields are 5–5 in two, 4–5 in two, otherwise 4–4. Femoral pores invariably 1–1.

In 86 specimens, 69 have two prefrontals; 3 have a small median scale between the prefrontals, not entirely separating them, and 14 have a median prefrontal, i.e., a row of three prefrontals.

No important variation is to be found in the ten Szechwan specimens. A specimen from Mukden (A. M. N. H. No. 8911, collected and presented by M. Nishimura) falls within the variation limits of the Ningkwo series. The single specimen from Fukien has 25–27 lamellæ beneath the fourth toe, but otherwise agrees with the remaining series. It should perhaps be compared with the Formosan species.

The largest male specimen measures 190 mm.; tail 143 mm.; the largest female 193 mm.; tail 142 mm.

Summary of Scale Characters and Measurements (Ningkwo series):

	SEX	NUMBER OF SPECIMENS	EXTREMES	AVERAGE
Ventrals in a	♂	27	27–31	29
Longitudinal Row	♀	33	28–32	30
Gulars from	♂	27	22–23	26
Collar to Chin-shields	♀	33	23–31	27
Lamellæ beneath	♂	27	21–24	22
the 4th Toe	♀	33	20–26	23
Length of Leg/	♂	27	.44–.50	.47
Length of Body	♀	33	.40–.50	.45
Tail-Length/	♂	20	.70–.75	.72
Total Length	♀	18	.70–.74	.72

Takydromus septentrionalis Günther

Thirty specimens, A. M. N. H. Nos. 23554, 23556, 23589, 23599–23600, Yenchingkau, October, 1921, and 23601–23604, Wanhsien, Szechwan, December, 1921, Walter Granger; 23568, Yochow, Hunan, 1922, Clifford H. Pope; and 31295–31306, 31313, 31317, 31320, 31362, 31379, 31389, 31394, 31396, Ningkwo, Anhwei, September, October, 1921, Clifford H. Pope.

The Szechwan and Anhwei series of this species are in close agreement, and they fall within the limits of the British Museum series reported upon by Boulenger (1921, p. 137).

Takydromus sexlineatus meridionalis (Günther)

Thirteen specimens of this species, A. M. N. H. Nos. 18616, 23613–23623, and 23584, were collected in Fukien Province by H. R. Caldwell.

In this series the chin shields are invariably three pairs, the femoral pores uniformly one on each side. The dorsals are in six rows in one specimen. In other characters the series falls within the limits of the large Hainan series which has been reported upon elsewhere.

Takydromus intermedius Stejneger

A. M. N. H. Nos. 22697–22698, collected at Yunnanfu, Yunnan, by John Graham, agree closely with the diagnosis of this form, described from Mt. Omei, Szechwan.

All have seven series of enlarged dorsals and six series of ventrals; 23–26 ventrals from anal plate to collar; 25–27 lamellæ beneath the fourth toe; all have four pairs of chin-shields and two femoral pores on each side. No. 22698 measures 171 mm.; tail 129 mm

Eremias przewalskii Strauch

Plate XXIX, Figure 1

Ten specimens from Mongolia, collected by R. C. Andrews, summer of 1922. A. M. N. H. Nos. 31503–31504 come from 260 miles S.E. of Sairusu, on the Sairusu-Kalgan trail; 31505–31506 from Pangkiang to Iren Dabasu; and 31507–31512 from Tsagan Nor, Gobi Desert.

The number of ventrals in a transverse row ranges from 16 to 18; the number of gulars from collar to chin-shields from 27 to 34; the number of femoral pores from 10 to 15. The labials anterior to the subocular are 5 in four counts, 6 in twelve, and 7 in four. The subocular reaches the labial border on both sides in one specimen. Variation in other characters is shown in the comparative table.

The extreme development of the vermiculate dorsal pattern is seen in the largest male specimens. Juvenile and female specimen show a tendency toward a pattern of longitudinal lines.

Eremias argus Peters

Plate XXX, Figure 1

Seventy-five specimens, A. M. N. H. Nos. 21374–21427 and 21429–21449, collected at Hsing Lung Shan, Eastern Tombs, Chihli, August, 1921, by Clifford H. Pope.

This series is without doubt representative of typical *argus*. Boulenger's description of the coloration of this form (1921, p. 338) includes both the typical ocellated pattern and the lineate and cross-barred pattern which is the usual coloration of the western species here described as *Eremias barbouri*, but he states that the ocellate pattern is more frequent. Boulenger's description of the juvenile pattern does not agree with the present series, thirty-five of which are juvenile specimens and have a pattern of distinct, black ringed, white spots, with longitudinal lines only on the temples. In the forty adult specimens, transverse black bars connect the spots in thirteen, and the spots are well isolated in twenty-seven.

The ventrals in a transverse row are 12 in one specimen, 13 in eight, 14 in thirty, and 15 in one. The labials anterior to the subocular are 4 in ten counts, 5 in a hundred and twenty-one, and 6 in nineteen. In the whole series, the suboculars reach the labial border on only one specimen, and on one side in another, with no correlation with other *brenchleyi* characters.

The number of gulars bordering the last pair of chin-shields in contact varies from two to nine, averaging 5.0. The number of gulars in line between the collar and chin-shields in forty specimens ranges from nineteen to twenty-five, averaging twenty-one. Variation in number of femoral pores is independent of sex (see below, under *E. barbouri*). Variation in measurements and in dorsal and ventral scale counts is shown in the comparative table (see below).

Three specimens from Manchuria, presented to the American Museum by Mr. M. Nishimura, agree closely with the Chihli series.

Eremias barbouri,[1] new species

Plate XXX, Figure 2; Figure 4

Type.—A. M. N. H. No. 24045; ♂; Mai Tai Chao, (40 miles east of Paotowchen) Shansi; May, 1922; Clifford H. Pope.

Diagnosis.—Directly allied to *Eremias argus*, from which it may be distinguished by its larger dorsal scales and a color pattern of light longitudinal lines combined with transverse black bars.

Description of Type.—Habitus unspecialized, head broad and deep, blunt in profile.

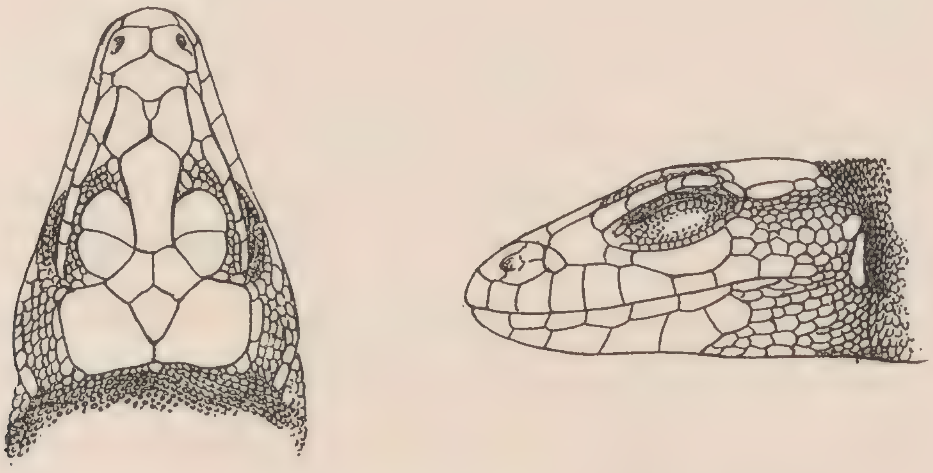

Fig. 4. *Eremias barbouri*, new species.
Dorsal and lateral views of head of type, × 2.

Rostral pentagonal, in contact with the first labials and supranasals; supranasals much larger than the subnasal and postnasal together, broadly in contact behind the rostral, a single frontonasal, partly divided, much broader than long, in contact with the supranasals, the prefrontals, and narrowly with both loreals; a pair of prefrontals in contact, longer than broad, with a small median anterior scute between them, each broadly in contact with the second loreal and the frontal, not in contact with the first supraciliary; frontal as long as its distance from the rostral, in contact posteriorly with the first supraocular, and very narrowly, on one side, with the second; two large supraoculars, followed by a very small one; four supraciliaries on each side, separated from the prefrontal and frontal by granules, which are reduced to a single series between the supraciliaries and the supraoculars; frontoparietals smaller than the posterior supraoculars, larger than the interparietal, much shorter than the parietals, in contact with the second large supraocular; parietals broadly in contact behind the interparietal; a series of four scales along the side of each parietal; two loreals, the anterior narrow, vertical; five labials on each side anterior to the subocular, which is cut off from the labial border by a sixth labial; chin-shields 4–5, the first one on one side being transversely divided.

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[1] Named for Dr. Thomas Barbour, of the Museum of Comparative Zoölogy, Cambridge, Massachusetts.

Back covered with small uniform granular scales, forty-eight across mid-body; fifteen ventrals in the longest transverse row; thirty-two transverse rows of ventrals; eleven enlarged scales in the collar; eighteen gulars from collar to chin shields; five gulars border the last pair of chin-shields in contact; a transverse row of small scales on the neck indicates a slight gular fold; femoral pores 11–12; lamellæ beneath the fourth toe twenty-two.

Color olive-gray above, with a pair of interrupted dorsolateral lines from the corners of the parietals to the base of the tail, on which they extend for a short distance; a double row of dorsal white spots between the dorsolateral lines, continuing as a single row on the base of the tail; a broad light lateral line, composed of united spots, and bordered with a few round black spots below; a series of black transverse bars above and below the dorsolateral lines, corresponding to the original spots, and extending to the dorsal and lateral lines; a few median dorsal black spots; venter uniform yellowish white; fore limbs with a few, hind limbs with numerous black spots.

Total length 123 mm., tail 68 mm., body 55 mm., leg 27 mm., leg/body, .49.

NOTES ON PARATYPES.—One hundred and seventy-one paratypes, all collected by Clifford H. Pope from localities in Shansi, have been examined in some detail. Of these Nos. 28348–28349, 31435, 24043–24044, and 24046–24141 are from Mai Tai Chao, May, 1922; 31411, 31418, 31425 and 31431 from So Huang Ping Ting, September, 1922; 31436–31442 from Ma Ying Hai, Ningwu July–August, 1922; and 31443–31495 and 31497–31502 from Chen Tzu. Taiyuanfu, July–August, 1922.

This large series shows a high degree of variability, A number of characters are compared with both *brenchleyi* and *argus* under the discussion of *brenchleyi* (see below). The variation in dorsals, ventrals, and measurements is shown in the comparative table for the genus.

In the four specimens from So Huang, Ping Ting, which were associated with *brenchleyi*, the dorsals across the body range from 46 to 59, and one specimen has the color pattern typical of *argus*. These specimens are thus possibly intergrades between *argus* and *barbouri*, while less close to *brenchleyi* than the series of *barbouri* from other localities.

In the seven specimens from Ningwu, which agree excellently with *barbouri* in scale characters, the pattern is ocellate, and apparently like that of *argus*. The dorsal ocellæ of *argus*, however, differ from the Ningwu series, and from *barbouri* in general, by being more widely spaced. In the Chen Tzu series the dorsal scales are somewhat smaller than in the topotypes.

The subocular reaches the labial border in four specimens, (very narrowly in two), and on one side in two more of the Mai Tai Chao series. Four specimens from Chen Tzu have the same character, but all of these agree in other respects with *barbouri* and not with *brenchleyi*. This character, which is normal in *brenchleyi*, may appear as an abnormality in both *argus* and *barbouri* without making the specimen in any sense an intergrade with *brenchleyi;* its occurrence in a high percentage of specimens from a given locality might be taken as evidence of intergradation. Specimens of *brenchleyi* in which the subocular is cut off from the lip may be expected; but the So Huang, Ping Ting specimens referred to *barbouri* can not be so regarded on account of their color and scale characters.

Juvenile specimens from Chen Tzu all have an interrupted dorsolateral and lateroventral white line; the lateroventral line forks in front of the shoulder and passes under and over the ear; the dorsolateral line is continuous anteriorly, and begins at the corner of the parietal; two series of dorsal white spots form straight lines, their black borders mostly connected with that of the dorsolateral line; the dorsolateral line continues on the base of the tail, (*argus* has spots on the base of the tail); the entire space between the two lateral lines is frequently dark, and the black on the back may be so increased as to leave only a distinct gray mid-dorsal band between the dorsal lines.

In twenty adults from Chen Tzu, all but one have the dorsolateral spots strongly elongated to form a well-defined dorsolateral line; this is quite continuous in No. 31491; dorsal white spots are never absent; transverse black bars on the back connect the spots, and are well marked in all except 31498, which has isolated ocellæ, only a few of which are connected by black markings.

Adult Mai Tai Chao specimens agree in coloration with the type. In forty juvenile specimens an ocellate pattern occurs in three, and these prove readily distinguishable from juvenile *argus* on direct comparison, as they have a larger number of spots and a much better defined lateroventral line.

"At Mai Tai Chao the Chinese call this lizard 'Rock Lion.' It is well named, as it was found only where rocks were plentiful, and it invariably sought shelter under or among them when alarmed. Its dashes for safety are much swifter and longer than those of the Sand Lizard (*Phrynocephalus*). Its attempts to hide under bushes only if no rocks are available.

"In the course of a two-hour walk through the dry, bushy, elevated area to the southeast of Chen Tzu, I saw fourteen 'Rock Lizards.' Instead of making for the stones and boulders, which were numerous at various places on the plain, these specimens nearly always made for a bush, hiding beneath it, or dodging around it. Only when hard pressed would they resort to holes beneath rocks." (C. H. P.)

Eremias brenchleyi Günther

Plate XXX, Figure 3

Thirty specimens are referred to *Eremias brenchleyi;* A. M. N. H. Nos. 31401–31410, 31412–31417, 31419–31424, 31426–31430, 31432–31433 from So Huang, Ping Ting, Shansi, September, 1922, and 31496, Chen Tzu, Taiyuan Fu, Shansi, July–August, 1922, collected by Clifford H. Pope.

It is gratifying to find a series of specimens representing this form, whose status was somewhat uncertain, even in Boulenger's latest revision (1921, p. 339). Unfortunately, even the present collection does not give the key to its distribution. The confusion of *brenchleyi* with typical *argus* has been largely due to the failure to distinguish between eastern *argus* and the Shansi form which I have described above as *E. barbouri*. It is highly probable that all three of these forms are connected by intergrades, as they are in fact connected by overlapping extremes in all of the characters which distinguish them. I have retained them as distinct forms, rather than as subspecies, only on account of my inability to explain their geographic relations. The range of *argus* is Korea, Chihli, and Shantung; type locality, Chefoo. That of *barbouri* is Shansi and probably southern Mongolia; type locality, Mai Tai Chao, northern Shansi. And *brenchleyi*, whose type locality is "Land of Grass," Mongolia, appears in the present collection from eastern Shansi, thus inserted between the ranges of *barbouri* and *argus*. It seems likely that, when the necessary field observations are made, habitat or altitude preference may afford a simple explanation of geographic ranges which at present appear complicated.

In the present series, which are at once placed with *brenchleyi* on account of the descent of the subocular to the labial border, the low number of dorsal scales across the back, the tendency to uniform dorsal coloration, and the more pointed head are in further agreement with the descriptions of Günther and Boulenger. The average values of other characters differ from both *barbouri* and *argus*. Thus, the femoral pores of the three forms vary as follows:

NUMBER OF FEMORAL PORES ON ONE SIDE	NUMBER OF SPECIMENS		
	argus	*barbouri*	*brenchleyi*
7	1	3	..
8	7	45	..
9	16	98	4
10	35	73	12
11	21	30	24
12	..	1	9
13	..	..	1

The ventral plates in the three forms range as follows:

NUMBER OF VENTRALS IN A TRANSVERSE ROW	NUMBER OF SPECIMENS		
	argus	*barbouri*	*brenchleyi*
12	1	2	16
13	8	15	3
14	30	44	9
15	1	7	..
16	..	5	..

The labials anterior to the subocular are less variable in the three forms, but *brenchleyi* has five in 26 cases and six in 22, while in both *barbouri* and *argus* five is exceeded in a much smaller proportion of specimens.

Variation in the number of gulars bordering the last pair of chinshields in contact has been examined, and differs in the three forms as follows:

NUMBER OF SCALES	*argus*	*barbouri*	*brenchleyi*
2	1	10	..
3	..	10	..
4	13	45	3
5	15	23	10
6	28	12	6
7	13	1	5
8	3	..	1
9	1	..	..

Comparative Table of Variation in Chinese *Eremias*

Species		Dorsals Across Back			Ventrals From Groin to Collar			Length Leg/ Length Body			Length Tail/ Total Length		
	Sex	No. Spec.	Extremes	Mean	No Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean
Eremias przewalskii (Mongolia)	♂	6	50–56	53	6	31–35	33	6	.51–.56	.53	2	.54–.56	.55
	♀	4	49–60	52	4	31–37	34	4	.47–.51	.49	2	.52–.57	.54
brenchleyi (Shansi)	♂	11	40–47	43	11	26–29	28	11	.59–.68	.64	10	.61–.67	.63
	♀	14	38–45	42	14	27–32	28	14	.55–.67	.61	13	.60–.65	.62
barbouri (Mai Tai Chao, Shansi)	♂	35	42–54	48	35	28–34	31	33	.49–.56	.53	28	.54–.59	.57
	♀	26	43–54	47	26	30–34	33	26	.43–.52	.48	22	.50.–56	.53
barbouri (Chen Tzu, Taiyuan, Shansi)	♂	8	48–52	50	8	27–32	28	8	.55–.61	.58	5	.56–.68	.63
	♀	11	45–55	49	11	28–32	30	11	.50–.64	.55	7	.55–.62	.58
barbouri (Ningwu, Shansi)	♀	7	44–47	46	7	29–31	30	7	.45–.56	.51	6	.53–.56	.54
argus (Chihli)	♂	10	54–66	57	10	29–32	31	10	.52–.56	.54	8	.57–.61	.59
	♀	30	48–65	56	30	28–34	31	30	.43–.55	.48	28	.52–.57	.54

Variation in dorsal and ventral counts and in measurements is shown in the comparative table.

In juvenile specimens the lateroventral line is continuous, straight-sided, and has a broad, lateral, dark brown band above it; the dorsolateral line is nearly continuous; the white spots of the dorsal series are very small and without black borders; they may be absent or may be represented by faint continuous lines. In medium-sized and adult specimens the mid-dorsal area tends to be uniform olive, or with scattered small black spots. The white spots are faint, when present, except in No. 31403, in which they are well defined; strap-shaped transverse black bars, characteristic of *barbouri*, are present in only a single specimen. The single Chen Tzu specimen has the typical *brenchleyi* coloration, a low dorsal scale count (44), and the subocular bordering the lip.

Scincidæ

Mabuya multifasciata (Kuhl)

Two specimens, A. M. N. H. No. 20984 and 20985, are from the Mom Ting River, Burma Border of Yunnan, March, 1917, collected by R. C. Andrews and Edmund Heller.

These two specimens agree in all essential characters with the series from Hainan, reported upon in a former paper.

Sphenomorphus indicus (Gray)

Eight specimens of this lizard come from widely distributed localities: A. M. N. H. No. 17459, Changsha, Hunan, July, 1921, J. W. Williams; 18610, 18613, 20991, near Yenping, Fukien, August 5, 1920, H. R. Caldwell; 20988–20989, Tengyueh, Yunnan, May, 1917, R. C. Andrews and Edmund Heller; and 23555 and 23588, Yenchingkau, Szechwan, October, 1921, Walter Granger.

These specimens exhibit some geographic variation, but the series are insufficient for definite conclusions as to the recognition of local races. The specimen from Changsha has the lateral band broken into vertical bars, much as in *L. zebratum* Boulenger, which Boulenger himself refers to *S. indicus*. The two Yunnan specimens have longitudinal black lines on the mid-dorsal brown area, which are absent in Fukien and Szechwan specimens, but such lines reappear in Formosan specimens (Stejneger, 1907, p. 216). The Yunnan and Szechwan specimens have 37–38 scales around mid-body, the Hunan and Fukien specimens 34–36. Werner, however, (1910, p. 43), records a Fukien specimen with 38 scales around the body.

Lygosaurus sowerbyi Stejneger

A single specimen, A. M. N. H. No. 23610, Fukien Province, 1921, collected by H. R. Caldwell, is in the collection.

This specimen, the second known, is notably larger than the type.

It has 30 scales around the body; 45 scales from base of tail to the parietals; 51 ventrals from anus to chin shields; 6 upper labials; 9 supraciliaries; 15–16 lamellæ beneath the fourth toe; body length, 76 mm.; hind leg, 22 mm.; leg/body, .29.

Leiolopisma monticola, new species

Figure 5

Type.—A. M. N. H. No. 20998; Snow Mountain Village, 9000 feet altitude, Likiang, Yunnan, China; November, 1916; R. C. Andrews and Edmund Heller.

Diagnosis.—Body elongate, limbs weak, separated when adpressed by the length of the arm; digits 5; head wider than the neck; an undivided transparent shield in the lower eyelid; no supranasals; ear opening without denticles; dorsal scales smooth, slightly larger than the ventrals, in 24 rows around the body; a pair of enlarged preanals; anterior loreal longest; frontal in contact with the anterior two supraoculars; front parietals larger than the interparietal; 12 lamellæ beneath the fourth toe; back light brown, with rows of darker spots; sides dark brown; venter very dark gray.

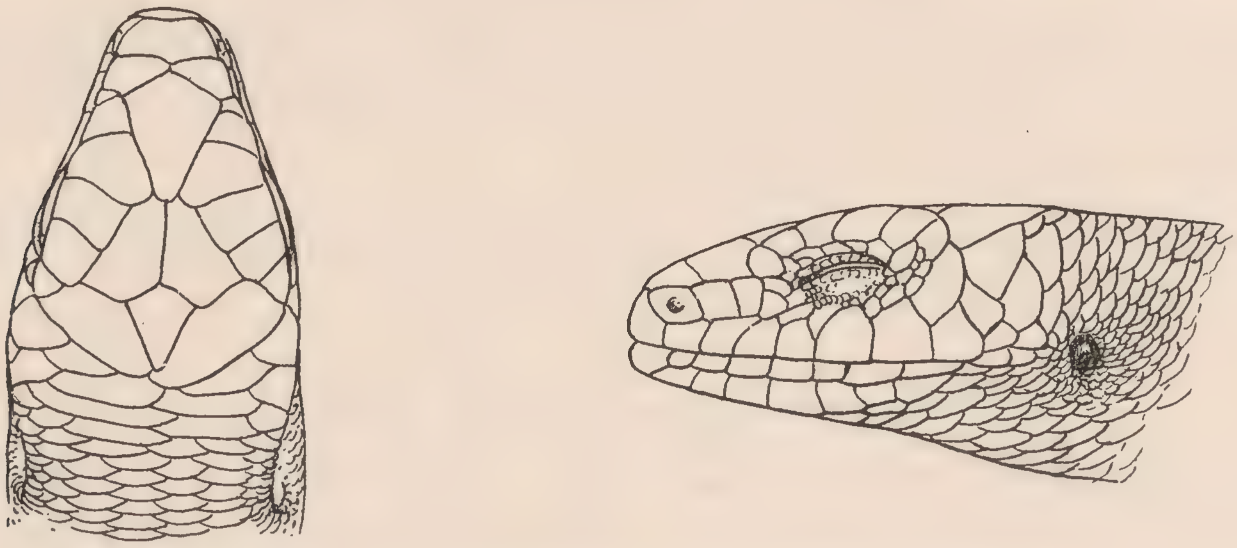

Fig. 5. *Leiolopisma monticola,* new species.
Dorsal and lateral views of head of type, × 3.

Description of Type.—Habitus elongate, limbs weak, separated when adpressed by the length of the arm; digits 5; head wider than the neck; ear opening small.

Rostral wider than high, broadly in contact with the frontonasal; frontonasal twice as broad as long; prefrontals meeting in a point behind the frontonasal; frontal kite-shaped, in contact with the two anterior supraoculars; frontoparietals larger than the interparietal; parietals meeting behind the interparietal; three pairs of enlarged nuchals; four supraoculars and small latero-posterior one; second supraocular largest; seven supraciliaries; nostril pierced in a single nasal; seven upper labials; anterior loreal largest.

Dorsal scales perfectly smooth, in twenty-four rows around the body, seventy from a point opposite the posterior border of the thighs to the parietals; two strongly enlarged preanals; twelve lamellæ beneath the fourth toe.

General ground color light brown; a dorsolateral light line, outlined above by a nearly continuous row of dark spots, below by solid brown, which lightens toward the belly and continues as a lateral line to the end of the tail; two somewhat discontinuous rows of dark spots on the middle of the back suggest the presence of a vertebral lighter line between them; upper surface of tail with dark spots; venter very dark gray.

The type measures 136 mm. from snout to tip of tail, the body composing 55 mm. and the tail 81; the arm measures 9 mm., the leg 12 mm.

NOTES ON PARATYPES.—In four male paratypes, A. M. N. H. Nos. 20996–20997, 20999–21000, from the type locality, the scales around the body are uniformly 24, and range from 66 to 78 from parietals to thigh. The subdigital lamellæ beneath the fourth toe are ten in two counts, eleven in three, and twelve in three. The prefrontals are in contact in two specimens, narrowly separated in one, and well separated in one. A single female specimen, A. M. N. H. No. 20995, from Snow Mountain at timberline, 13,000 feet altitude, has twenty-six scales around the body and a decidedly more elongate habitus, with a minute ear opening. These differences are in part accountable as sexual, perhaps in part due to variation in the 4000 feet of altitude difference.

This form differs from *Leiolopisma potanini* (Günther), (1896, p. 204), in having fewer scales around the body and fewer subdigital lamellæ. The latter character is unknown for *L. exigua* (Anderson), from Tengyueh, but *exigua* is said to have twenty-eight scales around the body, and is geographically remote from northern Yunnan. *L. sikkimense* seems to be allied to the present form, but it has 16 to 19 subdigital lamellæ and a much less elongate body.

Leiolopisma modestum (Günther)

Seventy-seven specimens are referred to this species: A. M. N. H. Nos. 23635–23650, Wanhsien, Szechwan, and 23651–23710, Chin Chow, Szechwan, collected by Walter Granger, 1921; and 23567, Huping College, Yochow, Hunan, spring of 1922, collected by Clifford H. Pope.

These specimens differ from the form of southern China, regarded as *reevesii* by me, in having fewer scale rows around the body, fewer dorsal scales in a longitudinal row, fewer subdigital lamellæ, and in having the prefrontals usually in contact, besides being strikingly different in coloration I do not think that *modestum* is to be thought of as subspecificially related to *reevesii*, and it is certainly much more closely related to the North American *laterale* than to *reevesii*.

The type locality of *L. modestum* is Ningpo, and it is unfortunate that there is no topotypic material at hand for comparison with the Szechwan series under consideration. I do not believe, however, that the *Leiolopismas* of the Lower Yangtze Valley will be found to differ from those of Szechwan.

The present series agrees with *septentrionale* and differs from *reevesii* in having a scalloped dorsal margin of the lateral brown band, and in having this band unbroken by light spots. The American *L. laterale* has a straight lateral band, lineate sides, and differs from *modestum* in the average values of scale characters. These relations are shown in the accompanying table of scale characters and measurements of the Chinese *Leiolopismas,* in which the Formosan and Rui Kiu species are included as far as available data permits.

Leiolopisma septentrionale, new species

Figure 6

Type.—A. M. N. H. No. 21451; Hsing Lung Shan, Eastern Tombs, Chihli Province; August, 1921; Clifford H. Pope.

Diagnosis.—Body elongate, limbs failing to meet by half the length of the arm; digits five; head wider than the neck; an undivided transparent shield in the lower eyelid; no supranasals; ear-opening without denticles; dorsal scales smooth, in 28 rows around the body; a pair of enlarged preanals; anterior loreal smaller than the second; fourteen or fifteen lamellæ beneath the 4th toe; sides dark brown, back light metallic brown, the dorsolateral line where the two colors meet regularly scalloped, not straight; throat lighter than the venter, with brown spots.

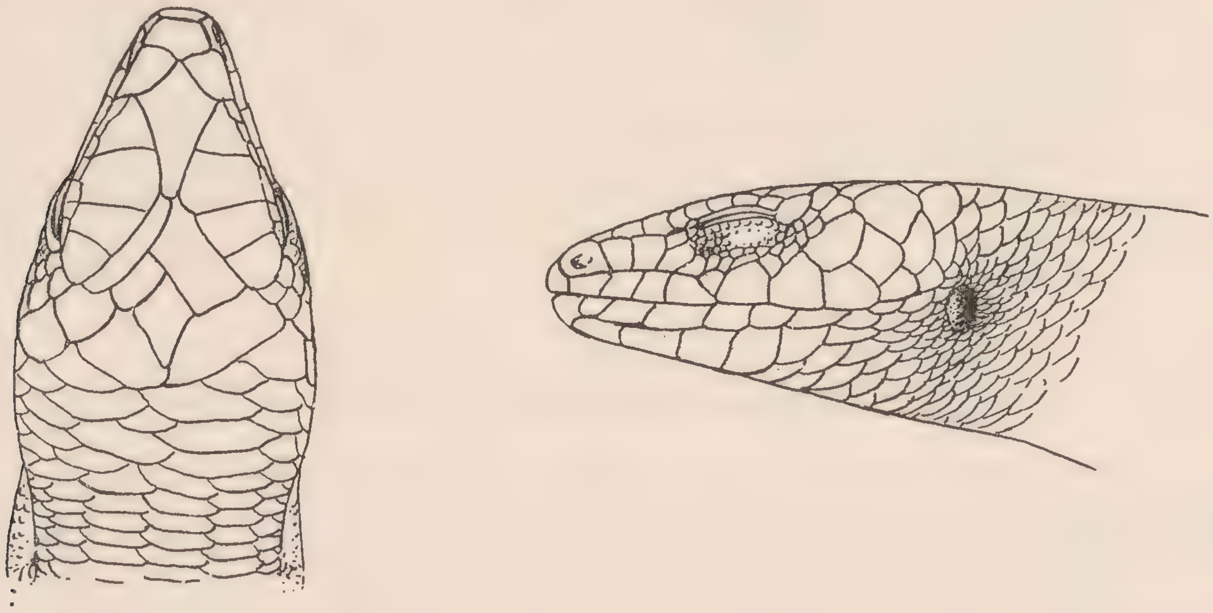

Fig. 6. *Leiolopisma septentrionale*, new species.
Dorsal and lateral views of head of type, × 3.

Description of Type.—Body elongate, not depressed, limbs failing to meet by half the length of the arm; digits normal; head broader than the neck; ear opening larger than the transparent shield in the lower eyelid

Rostral and frontonasal in broad contact, frontonasal broader than long, in contact with the frontal in a point; prefrontals moderate, barely meeting in front of the frontal; frontal kite-shaped, nearly as long as the frontoparietals and interparietals frontoparietals unequal, one nearly twice as large as the other; a small extra shield cut off from the interparietal; parietals forming a suture behind the interparietal; three pairs of broad nuchals; four supraoculars, the frontal in contact with the anterior two; six supraciliaries; anterior loreal smaller than the posterior; eight upper labials; temporals 2–2–3, the upper anterior smallest, the lower second, lower anterior, and upper second, in order of increasing size.

Twenty-eight smooth scales around the body mid-way between the limbs; 67 dorsal sales from the parietals to the posterior face of the thighs; seventy-eight ventrals from the postmental to the preanals; enlarged preanals as long as broad; fifteen smooth lamellæ under the fourth toe.

Back light metallic brown, covering the six dorsal scale rows and the adjacent half rows; sides dark brown sharply outlined above, less distinctly set off from the dark gray below; dorsolateral line, where the dorsal and lateral colors meet not straight, rather regularly scalloped; sides gray, with scattered brown spots; venter lighter gray; throat and lower labials light, spotted with brown; black spots forming fairly regular longitudinal rows on the light brown of the back.

Measurements:

	A. M. N. H. No.	21450 (Paratype)
Sex	21451 (Type)	
Snout to Anus	55 mm.	46
Snout to Ear	10	9
Snout to Arm	16.5	15.5
Axilla to Groin	33	29
Arm	12	10
Leg	16	14

Notes on Paratype.—The single paratype, also from Hsing Lung Shan, agrees in every respect with the type. It has 28 scales around the body; 67 from the parietals to the posterior face of the thighs; and fourteen lamellæ beneath the fourth toe.

When first described, I had compared this species primarily with *Leiolopisma reevesii* of southern China and with *L. laterale* of the southeastern United States. The subsequent examination of the large series of *L. modestum* from Szechwan (described above) proves that *septentrionale* is most closely allied to *modestum* to which it is also nearest geographically. I believe it to be well distinguished from *modestum* by its more elongate body. Additional material of this form is much to be desired for further comparison with both *modestum* and *laterale*.

Leiolopisma barbouri Stejneger

Figure 7

A. M. N. H. No. 22695, Yunnanfu, Yunnan, and 12803, Wutingchow District, Yunnan, collected by John Graham, represent this recently described form.

Diagnosis.—Head notably small, limbs short, body and tail elongate; scales around body 24–26; subdigital lamellæ of the 4th toe 14–16; no white spots interrupting the lateral dark band; black borders of the dorsal scales forming a feather-stitch pattern; prefrontals separated.

Description of A. M. N. H. No. 22695.—Body elongate, somewhat compressed, limbs short, separated when adpressed by the length of the leg; head proportionately small; tympanum well developed, nearly as large as the eye-opening; tail stout, slightly compressed, slightly constricted at its base.

Rostral broadly in contact with the frontonasal; frontonasal wider than long, narrowly in contact with the frontal; prefrontals narrowly separated, in contact with two loreals; frontal kite-shaped, about once and a half as long as broad; frontoparietals and interparietal subequal; parietals oblique, in contact behind the interparietal; enlarged nuchals 3–4, the first pair wedge-shaped; four large supraoculars followed by a small one between the last supraciliary and the parietal; seven supraciliaries; a few small postoculars, followed by four temporals of which the upper anterior is smallest and the upper posterior largest; anterior loreal higher than the second; dorsal scales smooth slightly smaller on the sides, 26 around the body, 68 in a line from parietals to thighs; 77 ventrals from anal cleft to chin; two enlarged preanals; 15 and 16 lamellæ beneath the fourth toes.

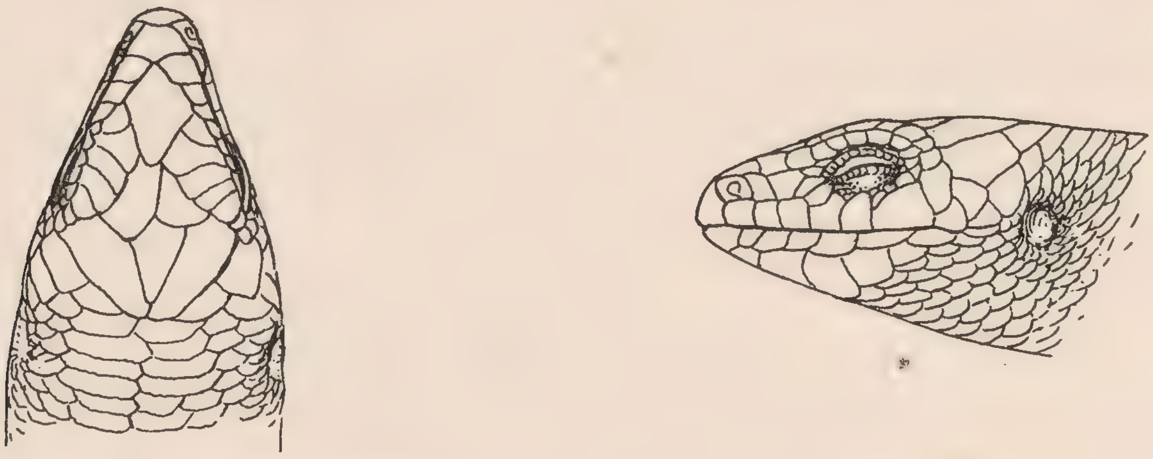

Fig. 7. *Leiolopisma barbouri* Stejneger.
A. M. N. H. No. 22695, Dorsal and lateral views of head, × 3.

General color olive-green, heavily maculate with black on back, sides, and venter, especially at the angles of the scales; throat with parallel dark lines, less distinct on the belly; a dark dorsolateral band from the end of the snout to the end of the tail (absent on the reproduced tip).

Measurements:

Body	48 mm.
Arm	8
Leg	12
Shielded part of head	7

This form may prove to be near *L. potanini*. The latter is very close to what I have called *modestum* in the present paper. It is certainly possible that *potanini* and my *modestum* may prove the same, but the Yunnan form here described is certainly distinct from our Szechwan series.

Comparative Table of Variation in Chinese *Leiolopisma*

Species		Scales Around Body			Dorsal Scales in a Longitudinal Row			Lamellæ Beneath 4th Toe			Length Leg/ Length Body			Length Tail/ Total Length		
	Sex	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean
Leiolopisma laterale (North America)	♂ + ♀	33	26–30	27.0	33	61–75	68	38	15–20	17	10	.29–.37	.32	7	.59–.66	.62
modestum (Szechwan)	♂	15	26–30	28.1	15	57–67	62	30	13–17	15	15	.30–.37	.34	10	.59–.63	.61
	♀	15	28–30	28.9	15	59–72	65				15	.29–.33	.32	10	.58–.62	.60
septentrionale (Chihli)	♂	2	28	28.0	2	67		2	14–15	14.5	2	.29–.30	.295			
formosensis (Formosa)	♂ + ♀	19	26–30	27.2	19	53–65	58	4	14–17							
bœttgeri (Ishigakishima)	♂ + ♀	26	28–32	29.2	26	59–66	63									
vandenburghi (Tsushima)	?	1	28	28.0	1	69	69	1	12	12						
reevesii (Hainan)	♂	18	30–32	30.4	18	66–74	70	18	16–19	18	18	.31–.37	.34	10	.63–.67	.65
	♀	9	30–33	31.2	9	69–76	73	9	17–19	18	9	.28–.33	.31	4	.62–.64	.63
barbouri (Yunnan)	♂ + ♀	4	24–26	25.0	4	68–74	72	4	14–16	14.5	3	.25–.28	.27			
monticola (Yunnan)	♂ + ♀	6	24–26	24.3	6	66–78	72	6	10–12	11	6	.18–.26	.23	1	.60	.60
exigua (Yunnan)	?	1	28	28.0												
potanini (Szechwan)	?	1	27	27.0				1	17	17	1	.31	.31			

Leiolopisma doriæ, Boulenger

Two specimens from Yunnanfu, Yunnan, A. M. N. H. Nos. 9123 and 12786, collected by John Graham, are referred to this species with some hesitation. They have 30–32 scales around the body instead of 26–28, but otherwise agree with Boulenger's description. Comparison material of the *Leiolopismas* of Upper Burma and western Yunnan is required for the satisfactory determination of the species in this area.

Eumeces pekinensis Stejneger

Twelve specimens, A. M. N. H. Nos. 21452–21463, collected at Hsing Lung Shan and 13 miles north of Hsing Lung Shan, Eastern Tombs, Chihli, August, 1921, by Clifford H. Pope.

Two very distinct color phases, connected by intermediate specimens, are represented in the present series. Six specimens are black above with five narrow white lines, a vertebral, a pair of dorsolateral on the third row, and a lateral on the fifth and sixth rows, passing through the ear; the lower line is black-bordered below; the vertebral line forks at the interparietal and outlines this shield and the frontal. The dorsolateral lines extend on the supraciliary border to the canthus; the three upper lines extend on the base of the tail; venter dark gray, throat lighter.

The second color-phase is represented by three specimens which have the two and a half scale rows on each side of the vertebral line uniform greenish olive; a black lateral band on the next 1½+1+1½ scale rows, below which is the light lateral line; the lateral line is faint because its black lower border is narrow and interrupted. Head brownish olive above.

The transitional stages between the two patterns are represented by three specimens. The two broad dark dorsal bands become lighter until they are represented by narrow black lines which outline the position of the light lines, while the latter come to be of the same shade as the new dorsal ground color.

The upper labials are seven in eleven specimens, six in one. The supraciliaries range from six to eight. The lamellæ beneath the fourth toe are fifteen or sixteen. The scales around mid-body are 24 in two, 23 in two, and 22 in eight specimens. The dorsal scales from the posterior border of the thighs to the parietals vary only from 52 to 58, averaging 55.

The largest specimen measures 210 mm. of which the tail occupies 130 mm. The length of the hind leg averages 0.39 of the body length. The tail length (in seven specimens) averages 0.60 of the total.

"Three skinks were found August first, each in a burrow with eggs. The burrows were under two rather large stones on a rocky hillside, within ten feet of each other. In each case, a part of the burrow extended beyond the stone into the soil, while the eggs were spread out in the portion exposed by lifting the rock. The burrows were about twelve inches in length, two inches wide, and less than an inch in depth. Two nests contained four eggs each and the third eight. The eggs measured 11×15 mm. Their color was a uniform grayish brown.

"Persistent search on the same hillside, though at some distance from the three nests, failed to locate others. A single specimen, without eggs, was found in a burrow beside a stone on another hillside. On August fourth we returned to the site of the first nests found, and discovered three more, within a radius of a few feet, each with eggs, and guarded by a female skink. These three burrows were much like the first ones found, but were under small stones, which merely covered the opening. The eggs were immediately beneath the stone in two nests, distributed along the burrow in the third. The number of eggs in the several nests was four, seven and eight.

"These observations show that this species has a well-defined type of burrow, that the female remains with the eggs, and probably indicate that the breeding females assemble in small colonies." (C. H. P.)

Eumeces chinensis Gray

Six specimens, A. M. N. H. Nos. 20986–20987, from Futsing, Fukien; 23569–23570 from Yenping, Fukien; and 23609, from Fukien Province, the first two collected by R. C. Andrews and Edmund Heller, July, 1916, the remaining by H. R. Caldwell, 1921; 23550, Yenchingkau, Wahnsien, Szechwan, collected by Walter Granger, October, 1921.

This series is compared in detail with the specimens referred to *E. pulcher*, under the discussion of the latter form.

Eumeces pulcher (Duméril and Bibron)

Seven specimens; A. M. N. H. Nos. 23557, Huping College, Yochow, Hunan, spring, 1922; and 31203–31207 and 31226, Ningkwo, Anhwei, September–October, 1921, all collected by Clifford H. Pope.

This series differs from the Fukien *chinensis* in a number of characters, each insufficient if taken alone, to warrant the distinction of a species (or subspecies) but amounting to conclusive evidence when taken together. The number of scales around the body is 24 in five, 25 in one, and 26 in one. In six *chinensis* 24 occurs in three, 26 in three. The dorsals in a longitudinal row range from 48 to 53 in *pulcher*, from 50 to 53 in *chinensis*. The ventrals in *pulcher* range from 53 to 56, from 54 to 57 in *chinensis*. The upper labials in *pulcher* are 6 in ten counts, 7 in four, while in *chinensis* they are 6 in two cases and 7 in ten. The supraciliaries range from 7 to 9 in *chinensis* and from 6 to 9 in *pulcher*. The lamellæ beneath the fourth toe are uniformly 16 in *chinensis* and range from 13 to 17, with an average of 15, in *pulcher*. The average length of the hind leg, compared with that of the body (length of leg/body length), is much greater in *chinensis*:

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
chinensis	♂	4	.37–.38	.38
	♀	2	.33	.33
pulcher	♂	2	.30	.30
	♀	4	.28–.33	.31

In addition to the number of labials and the length of the leg, the two forms are decidedly different in coloration. None of the Fukien specimens show a trace of longitudinal dorsal lines, and they have scarcely any black markings on the sides. In the Ningkwo specimens adult male and female and juvenile color patterns are well represented.

In No. 31203, ♂, the back is uniform olive; head brownish above, especially on the temporal region and the snout; venter very light gray, extending well up on the sides; a diffuse dark band on the sides consisting chiefly of dark posterior margins of the scales of the fourth and fifth rows from the vertebral line; numerous scales on the anterior portion of the sides and especially on the neck, entirely pinkish orange; scales on the upper sides of the limbs with dark outlines.

In No. 31205, ♀, the venter is light gray, the anterior margin of each scale black; these black marks become faint on the throat and are absent on the chin; a pair of black dorsal lines, which occupy the outer half of the first scale row and the inner half of the second (counted from the vertebral line) outline three olive dorsal lines, of which the vertebral is the most sharply defined; the black lines consist of nearly confluent black spots; top of head uniform olive with a few faint black markings; sides largely black but with numerous light spots on the anterior margins of individual scales; labials outlined with black; limbs largely black above.

No. 31226, juvenile, is coal black above, very dark gray below; vertebral light line sharply defined and continuous; dorsolateral lines slightly interrupted; sides with a number of light spots, not arranged in a definite row; top of head olive, clouded with black; upper and lower labials with very distinct white spots.

The juvenile color pattern was described by Duméril and Bibron, the type of *pulcher* having been a juvenile specimen. As the type locality of neither *pulcher* nor *chinensis* was fixed more closely than "China" in the original descriptions, I have adopted the two names in the sense of Duméril and Bibron, who are the first revisors. Cantor's *Tiliqua rufoguttata*, type locality Chusan, is evidently a synonym of *pulcher*.

The specimens from Hunan and Szechwan, referred respectively to *pulcher* and *chinensis*, are somewhat unlike the Ningkwo and Fukien series, and are indistinguishable in scale characters from each other. They have been assigned to their respective species on the basis of coloration and geographic probability. It seems highly probable that additional collections will make it possible to unite these two forms as subspecies of *chinensis*.

Eumeces elegans Boulenger

Forty-nine specimens represent this species: A. M. N. H. Nos. 17422, collected at Changsha, Hunan, July, 1921, by J W. Williams; 18612, 20992, 23571–23583, near Yenping, Fukien, and 23611–23612, Fukien Province; 22696, Yunnanfu, Yunnan, collected by John Graham; 20993–20994, Yunnan Province, collected by R. C. Andrews and Edmund Heller, 1916–1917; 23587, Wanhsien, Szechwan, December, 1921, collected by Walter Granger; and 23566, 31208–31225, and 31227–31234, Ningkwo, Anhwei, collected by Clifford H. Pope, September–October, 1921.

This series is remarkably uniform and presents no evidence of geographic variation.

SERPENTES

Typhlopidæ

Typhlops braminus (Daudin)

A single specimen, A. M. N. H. No. 23490, represents this species in the present collection. It was collected near Yenping, Fukien Province, 1921, by H. R. Caldwell.

The interesting note by Robert Mell (1922, p. 114) that this species is frequently found in flower pots throws light on the mode of dispersal of this singularly distributed form. It is quite as singular that no other species of *Typhlops* exhibits a similar erratic distribution.

Colubridæ

Sibynophis collaris chinensis (Günther)

Three male specimens of this form are in the collection: A. M. N. H. Nos. 18615, mountains near Yenping, Fukien Province, August, 1916, R. C. Andrews and Edmund Heller; 23493, Fukien Province, 1921, H. R. Caldwell; and 21471 "China," purchased at Hsing Lung Shan, Chihli, 1921, by Clifford H. Pope.

The two Fukien specimens each have 182 ventrals, and 104 and 108 caudals respectively. The specimen without locality has 168 ventrals and 106 caudals. No. 18615 has the lower anterior temporal extended to the labial border, thus constituting an extra labial, i.e., labials 10–10, instead of 9–9, as in the other specimens. In all three the dorsal scales are in 17 rows from head to tail; the 4th, 5th, and 6th labials enter the eye; the lower labials are 9; the pre- and postoculars are 1–2; and temporals 2–2, except in the anomaly noted above. No. 23493 measures 694 mm., the tail amounting to .31 of the total length. A fourth specimen, from Changsha, Hunan, has 182 ventrals and 103 caudals.

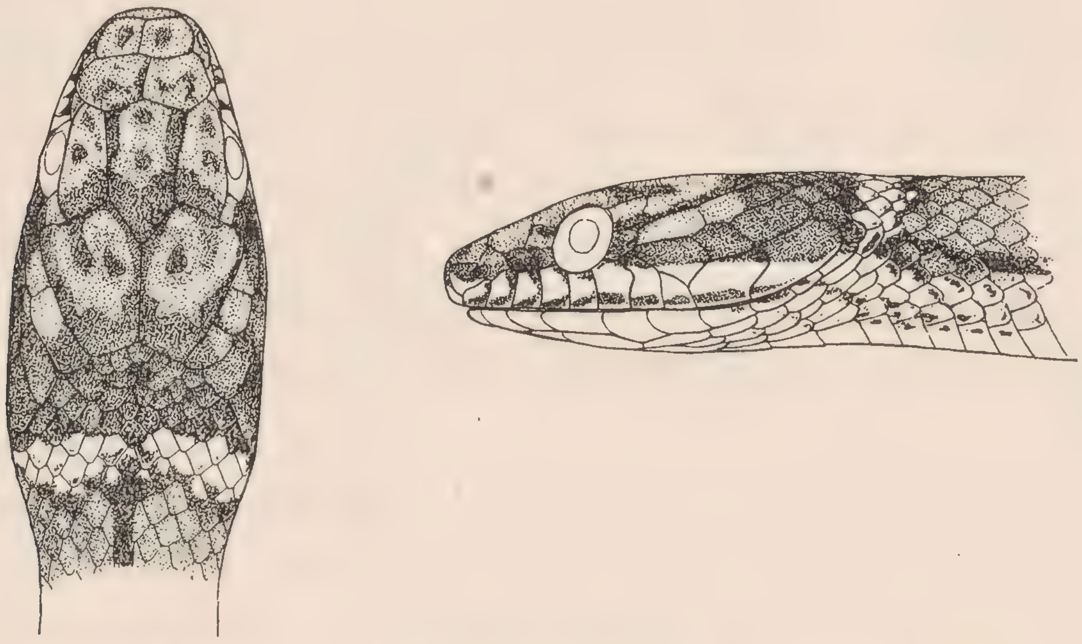

Fig. 8. *Sibynophis grahami* (Boulenger).
Dorsal and lateral views of head of A. M. N. H. No. 12804, × 2.

Sibynophis grahami (Boulenger)

Figure 8

Two specimens of this species, A. M. N. H. Nos. 18080 and 12804, from Yunnanfu and Wutingchow, Yunnan, in the Graham collection, are in the American Museum. These agree with Boulenger's description (1904, p. 132) in coloration. Their ventral counts are 188 and 194; tails incomplete.

Natrix æquifasciata Barbour

Figure 9

A single male specimen of this striking species, A. M. N. H. No. 21037, Futsing, Fukien, R. C. Andrews and Edmund Heller, July, 1916.

The dorsal scale count is 21–19–17, ventrals 151, anal divided, subcaudals 76. The dorsal scales are without pits, all strongly keeled except the outer row, which is faintly keeled. The maxillary teeth are 26, subequal. The internasals are narrowed anteriorly, their suture with the rostral less than that of rostral and first labial. Upper labials 9. One preocular, 3–4 postoculars, and 2–3 very small suboculars, which exclude the labials from the eye. Lower labials 9–10. Temporals 4–3–3 and 2–3–4, two of the first row on the side with four being very small. The total length is 813 mm. of which the tail constitutes .23.

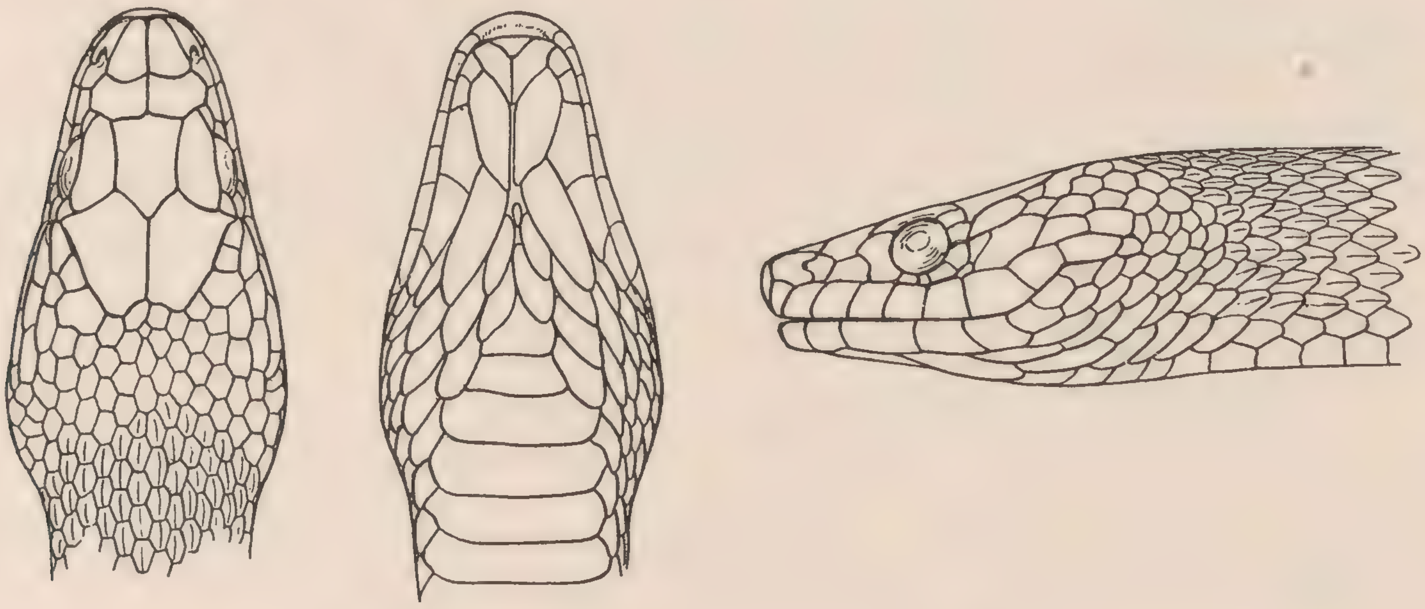

Fig. 9. *Natrix æquifasciata* Barbour.
Dorsal, ventral, and lateral views of head of A. M. N. H. No. 21037, natural size.

The top and sides of the head, including the labials, are uniform dark brown. Back brown, with broad transverse dark bands which join the more strongly marked quadrangular black blotches of the venter. These bands are hourglass-shaped on the sides and dorsally are split with a short transverse light marking. The ventral black marks are mostly offset on the mid-ventral line. Ventral ground color yellowish, clouded with brown posteriorly; lower labials clouded with brown, chin-shields like the venter. Twelve black marks beneath the tail.

Barbour's types of this species were two juvenile specimens from Hainan. The specimen above described differs chiefly in the presence of the suboculars, and in the less distinct color pattern. Even in the two types, however, the oculars are highly variable, and the pattern difference appears to be an age character. In habitus and general features of both scaling and coloration, *Natrix æquifasciata* appears to be allied to *Natrix annularis* and *percarinata.*

Natrix annularis (Hallowell)

Thirty-two specimens of this species as follows: A. M. N. H. Nos. 18617, Fukien Province, March 18, 1921, H. R. Caldwell; 23525, 23530, 23532, 24626–24630, Wuhu, Anhwei, September–October, 1921, C. H. Pope; 24527–24528, 24568–24577, 24596–24606, Ningkwo, Anhwei, September–October, 1921, C. H. Pope.

In this series the dorsal scales are uniformly 19–17. The upper labials are normally 9, 8 occurring five times and 10 twice, in which cases the 4th and 6th labials, respectively, enters the eye, instead of the 5th. Lower labials 10, rarely 9. Pre- and postoculars invariably 1–3. Temporals normally 2–3, 1–3 occurring fourteen times.

No. 24597 gave birth to nine young September 28, 1921. One of these is a monster, grown together where it was doubled upon itself in the egg-membrane and with a projecting lower jaw.

Summary of Measurements and Scale Characters[1]

	Sex	No. of Specimens	Extremes	Average
Ventral Plates	♂	5	152–159	156
	♀	12	149–153	151
Subcaudals	♂	3	61– 68	64
	♀	10	51– 62	59
Total Length	♂	3	381–541 mm.	477 mm.
	♀	10	407–837 mm.	654 mm.
Tail/Length	♂	3	.20–.22	.21
	♀	10	.20–.22	.21

Natrix percarinata (Boulenger)

Six specimens in the collection belong to this species: A. M. N. H. Nos. 21036, Futsing, Fukien, July, 1916, R. C. Andrews and Edmund Heller; 23491, Fukien Province, H. R. Caldwell, 1921; 23522, Yenping, Fukien, H. R. Caldwell, 1921; 23498–23499, Yenchingkau, Wanhsien, Szechwan, October, 1921, Walter Granger; and 23538, bought at Wuhu, Anhwei, by Clifford H. Pope, 1921.

The two Szechwan specimens, a male and female, each have 139 ventrals and 71 caudals. In the Fukien specimens the ventrals range from 138 to 143, the caudals from 70 to 74. No. 21036 has the dorsal scale formula 19–21–17, 19–17 in the others. One specimen has eight upper labials, nine in the rest; lower labials uniformly ten; preocular single in all: postoculars four or five; anterior temporals two except in a single specimen, which has one on one side; second row of temporals usually three, four in one case. The largest specimen, No. 23499, ♀, measures 964 mm. The tail length in the series varies from .25 to .27 of the total.

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[1] Adult specimens from Wuhu and Ningkwo.

This species is evidently allied to *Natrix annularis*. The juvenile coloration is much more sharply defined than in the adult, and the dorsal crossbands are split with a white line as in *N. æquifasciata*. These three forms therefore compose a closely connected group although there is no doubt that they are to be retained as fully distinct species.

The record from Szechwan is a great extension of the range of this species, which has hitherto been known from Fukien and Hainan. It has recently been recorded from Indo-China by Parker (1925, pp. 302, 304).

Natrix piscator (Schlegel)

Three specimens, A. M. N. H. Nos. 21038, 21039, and 21042, from Futsing, Fukien, July, 1916, R. C. Andrews and Edmund Heller.

This species seems to reach the northern boundary of its range in southern Fukien. The Fukien specimens are in excellent agreement with the Hainan series of which I have given an account elsewhere.

Natrix sancti-johannis Boulenger

Two specimens, A. M. N. H. Nos. 21070, 21071, Mom Ting River, Yunnan, March, 1917, R. C. Andrews and Edmund Heller.

This species is apparently new to China, and must be supposed to have entered via the tropical river valleys from Burma. It has previously been known from northern and central India.

Scale Characters and Measurements

A. M. N. H. Nos.	21070	21071
Sex	♀	♂
Dorsal Scales	21–19–17	19–17
Ventrals	151	143
Subcaudals	78	86
Upper Labials	9	9
Lower Labials	10	10
Preoculars	1	1
Postoculars	3	3–4
First Temporals	2	2
Second Temporals	2–3	1–3
Total Length	730 mm.	805 mm.
Tail/Length	.26	.30

Natrix craspedogaster (Boulenger)

Four specimens in the collection: A. M. N. H. Nos. 18614, 21018, 21019, Mountains near Yenping, Fukien, summer, 1916, R. C. Andrews and Edmund Heller; 23528, bought at Wuhu, Anhwei, by Clifford H. Pope, 1922.

These specimens agree excellently with Boulenger's description and figure. The dorsal scales are uniformly 19–17; the ventrals range from 144 to 150 (without sex distinction); the subcaudals are 82–89 in two females, 91 in the two males; upper labials 8, with a single exceptional 9; lower labials 10, with an exceptional 11; preocular uniformly single; postoculars 3, except in one specimen which has 3–4. The temporals, due to the height of the seventh labial, show an evident tendency to reduction in the second row; they are 1–0, 2–2–3, 2–1–2, and 1–1–2 in the four specimens. No. 18614 has two loreals on each side. The maximum size is attained by the Wuhu specimen, a female, 516 mm. in length. The tail length ranges from .29 to .31 of the total.

Natrix stolata (Linnæus)

Ten specimens, A. M. N. H. Nos. 21016–21017, Yenping, Fukien, summer, 1916, R. C. Andrews and Edmund Heller; 21029–21032, 21040, 21041, Futsing, Fukien, R. C. Andrews and Edmund Heller, July 28, 1916; 23492, Fukien Province, H. R. Caldwell, 1921; and 23526, bought at Wuhu, Anhwei, by Clifford H. Pope, 1922.

There is more black on the outer ends of the ventrals in this series than in the Hainan series which I have recently examined. The examination of Wall's figure (1911, Pl. XIV) indicates that the yellow neck, which is so characteristic of the Hainan and Kwangtung specimens of this species, is unknown in Indian specimens.

Summary of Scale Characters and Measurements

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventral Plates	♂	3	146–157	150
	♀	7	143–157	149
Subcaudals	♂	2	75–76	75.5
	♀	5	69–79	73
Length	♂	2	495–507 mm.	501 mm.
	♀	5	309–650 mm.	534 mm.
Tail/Length	♂	2	.25–.26	.255
	♀	5	.24–.25	.248

Natrix tigrina lateralis (Berthold)

Fifty-two specimens of this species are in the collection: A. M. N. H Nos. 23501, 23507, 23509, Yenchingkau, 1500 feet altitude, Wanhsien, Szechwan, October 1921, Walter Granger; 23506 Luanshikau, 3000 feet altitude, Wanhsien, Szechwan, September, 1921, Walter Granger; 24578–24593, 25548–25549, Ningkwo, Anhwei, September–October, 1921, C. H. Pope; 21476–21478, Hsing Lung Shan, Eastern Tombs, Chihli, August, 1921, C. H. Pope; 23935–23943, Mai Tai Chao, Shansi, May, 1922, C. H. Pope; 28268, 28314–28328, Chen Tzu, Taiyuan, Shansi, July–August, 1922, C. H. Pope; 28335, Niangtzekwan, Shansi, September, 1922, C. H. Pope; 24623, Tsing Ling Mts., Shensi, 1922.

I am unable to find characters of any importance to distinguish the Szechwan series from eastern or northern specimens. The chief characters of the Anhwei series may be compared with those of the North Chinese specimens from Chihli, Shansi, and Shensi in the following two tabulations:

Summary of Scale Character and Measurements

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
		Anhwei Series		
Ventral Plates	♂	13	144–154	151
	♀	5	151–155	153
Subcaudals	♂	12	59–65	62
	♀	5	50–58	55
Length	♂	12	451–692 mm.	617 mm.
	♀	5	538–670 mm.	640 mm.
Tail/Length	♂	12	.21–.23	.22
	♀	5	.17–.19	.18
		Chihli, Shansi, and Shensi Series		
Ventral Plates	♂	11	148–157	153
	♀	18	152–163	157
Subcaudals	♂	11	60– 69	64
	♀	11	59– 61	58
Length	♂	10	588–759 mm.	671 mm.
	♀	11	589–860 mm.	727 mm.
Tail/Length	♂	10	.21–.23	.215
	♀	11	.18–.19	.185

Many specimens of this species exhibit a tendency to an even number of scale rows on the neck, with a nuchal groove which suggests the much more pronounced one of *Natrix nuchalis*.

A specimen from Mai Tai Chao contained a large *Bufo raddei*.

"A small green and red 'tiger snake' caught at Chen Tzu gave an excellent exhibition of the behavior of this species when annoyed. It flattened the whole body, especially the neck, and the sides of the neck were drawn down until the angle below was a right angle, or less, and the skin above was tightly stretched over the vertebræ. Just behind the head the neck was strongly arched, to such a degree as to make a fold of loose skin appear under the head where head and neck meet. The head, held in this position, was raised from one to four inches from the ground. The body was thrown into varying but gracefully regular coils. This snake could not be induced to bite or strike, but when its body was pinched at any point it would turn and 'butt' with its nose, but not with any particular violence. Sometimes the head and arched neck would be thrown well back, and then its attitude was much like that of a cobra.

"This flattening of the neck brings into vivid contrast the alternate red and green bars of its sides, and gives the snake a highly venemous appearance." (C. H. P.)

Natrix leonardi Wall

Six specimens, A. M. N. H. Nos. 21061–21064, 21068–21069, Tengyueh, Yunnan, May, 1917, R. C. Andrews and Edmund Heller.

The dorsal scales in this series range from 18–17–15 to 16–15; ventrals from 145 to 155, 155 in the single male specimen; caudals from 46 to 52 in the five female specimens, 64 in the male. The upper labials are uniformly six, the lower labials eight with an exceptional seven. All have a single preocular, and the postoculars are two or three. The temporals are 1–0–1 in one, 1–1 in three, and 1–2 in two. The length ranges from 444 mm. to 615 mm. The tail length is .23 of the total in the male specimen, and ranges from .17 to .20 in the female specimens.

The reddish or orange nuchal collar, interrupted on the two median scale rows, is a striking color character.

The type locality of this species is about opposite Tengyueh, in Burma. (Wall, 1923, p. 466.)

Parker (1925, p. 296) refers this species to *Natrix nuchalis* (Boulenger) after examining the variation in dorsal scale counts in a series from Tonkin, Burma, and Yunnan. He does not account for the differences in ventral count and coloration, and in fact the table of variation in dorsal scale rows seems to indicate a considerable degree of geographic differentiation. Steindachner (1914, p. 321, fig. 1) has examined a series of fourteen *Natrix swinhonis* from Formosa and proposes to unite *nuchalis* with *swinhonis*. The range of ventral counts given by him unfortunately contains an error, so that it is impossible to tell whether the maximum for Formosan specimens is 155 or 165. The reddish nuchal collar apparently allies *swinhonis* and *leonardi.*

For the present I have accordingly retained four of the species with a nuchal groove as distinct, though they undoubtedly compose a "Formenkreis."

The origin of the nuchal groove may be dependent on some characteristic attitude. *Natrix tigrina* occasionally has an even number of scale rows on the neck, and Mr. Pope's field notes are instructive in this connection.

Natrix nivalis, new species

Type.—A. M. N. H. No. 21021; ♀; Snow Mountain Village, at 9000 feet altitude, Likiang, Yunnan; November, 1916; R. C. Andrews and Edmund Heller.

Diagnosis.—Directly derived from *Natrix nuchalis*, from which it is distinguished by the lower number of ventral plates, and a proportionately broad and short frontal. Dorsal scales weakly keeled, in 17 rows; ventrals 150–152; anal divided; subcaudals 43–54; upper labials 6, the fifth very large; one preocular; postoculars 1–3; temporals 1–1 or 1–2; general color dark olive brown, without markings at the base of the scales; venter dark gray, the median part black.

Description of Type.—Habitus not specialized; head slightly distinct from the neck; eye moderate.

Rostral wider than high, well visible from above; internasals about as wide as long, shorter than the prefrontals; frontal nearly as broad as long, slightly longer than its distance from the rostral; parietals nearly as long as their distance from the rostral, truncate posteriorly; two nasals; loreal small, as high as long; one preocular; postoculars 1–2; upper labials five, the first with a notch indicating the fusion of two labials, the fourth very large, the second and third entering the eye; lower labials eight, four in contact with the anterior chin-shields; second pair of chin-shields longer than the first, divergent; temporals 1–1 and 1–2, the first elongate.

Dorsal scales with low keels, the two lower rows perfectly smooth anteriorly, in 18–17–15 rows. A well-defined nuchal groove, correlated with the even number of the scale rows, as in *Natrix nuchalis* and *N. leonardi.* Ventrals 152; anal divided; subcaudals 54.

Color uniform dark olive-gray above, without markings at the bases of the scales; venter lighter anteriorly, clouded with darker markings posteriorly, especially on the anterior borders of the ventrals; no trace of a nuchal collar; labials without markings.

The type measures 625 mm., of which the tail occupies .18.

Notes on Paratypes.—The two paratypes, both female specimens, A. M. N. H. Nos. 21025–21026, come from the type locality. Both have a nuchal groove, scales without black markings, and a very large penultimate labial. The ventral counts are 150 and 151, the subcaudals 43 and 46. The upper labials are six in both. The postoculars are two in one and three in the other. The temporals are 1–1–2 in No. 21025, due to the division of the elongate first temporal. One has the scales in fifteen rows throughout, seven on one side and eight on the other anteriorly, the other has sixteen scale rows on the neck, fifteen posteriorly.

This species is evidently directly allied to *Natrix nuchalis*, whose type locality is Ichang. Besides the difference in the form of the frontal, the ventral scales are decidedly fewer in the Yunnan form.

Eight specimens from Yunnanfu and Wutingchow in the Graham collection support the distinction of *nivalis* from *nuchalis* on the ventral scale count, which ranges from 137 to 147. These specimens lack the reddish nuchal collar which apparently distinguishes *leonardi*. Yunnan specimens recorded by Werner (1924, p. 44), as *nuchalis* have a similar ventral count, 140 to 148, and thus agree with *nivalis*.

Natrix handeli (Werner)

Figure 10

A. M. N. H. No. 21023, ♂, Likiang, Yunnan, R. C. Andrews and Edmund Heller, 1916.

The dark venter of our specimen, which is wholly black for its posterior third, differs from Werner's description (1924, p. 45), in which the venter of his specimen is said to be light. The present specimen agrees in many details of scaling, in general features of coloration, and comes from the type locality, but differs in minor characters.

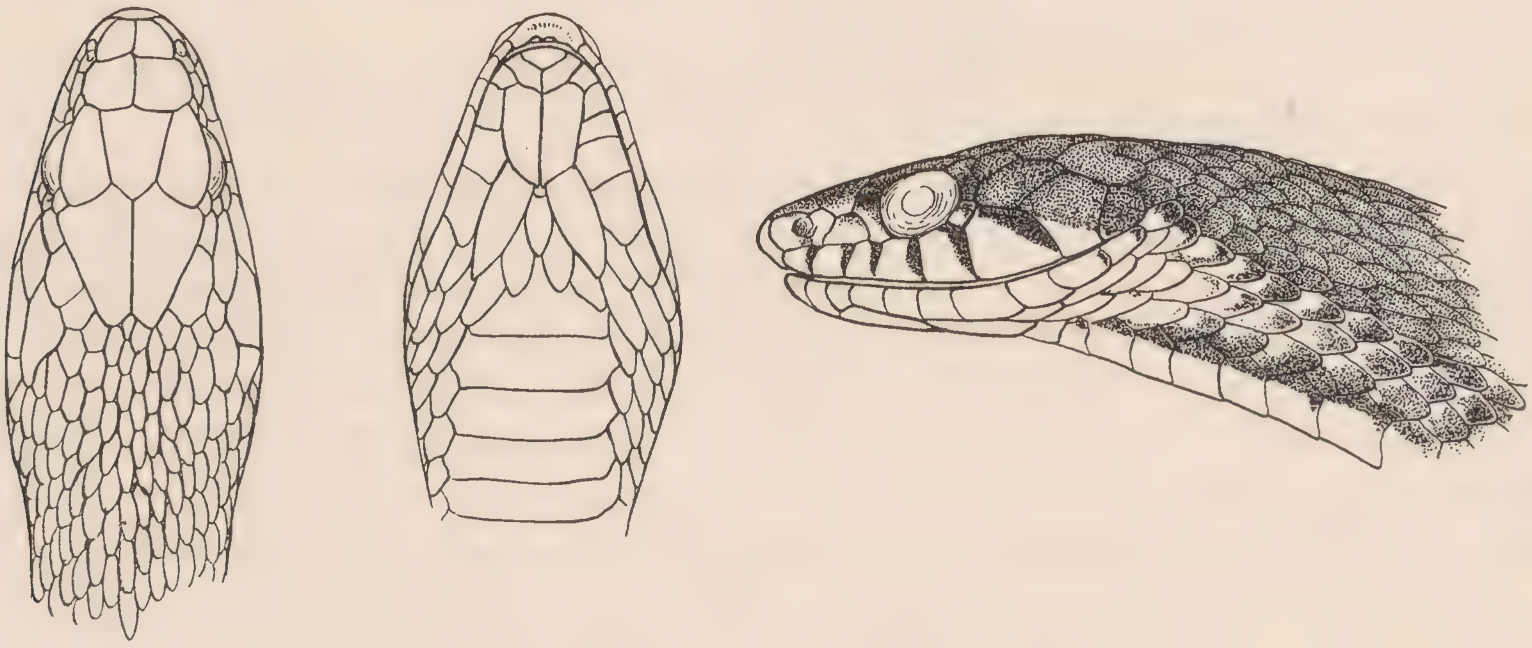

Fig. 10. *Natrix handeli* (Werner).
Dorsal, ventral and lateral views of head of A. M. N. H. No. 21023, natural size.

Dorsal scales 19–17–15, strongly keeled, the outer row smooth; ventrals 153; anal divided; subcaudals 65; upper labials 8, 4th and 5th, entering the eye; lower labials 9; oculars 1–3 on each side; temporals 1–2; length 755 mm., tail length .23. The maxillary teeth are 21+1, the last strongly enlarged. Dorsal scales with distinct apical pits. The internasals are subquadrate, their rostral suture greater than that of rostral and first labial.

The color is very dark brown above, loreal area and upper labials light brown; lower labials immaculate; sutures of the upper labials black, the seventh and eighth largely black; some square, obscure, light marks on the sides; throat and venter anteriorly light, with a well-defined longitudinal black line on the ends of the ventrals, beginning on the chin, but quickly merged into the increasing dark clouding of the venter; posterior third of the venter wholly black.

Natrix helleri,[1] new species

Figure 11

Type.—A. M. N. H. No. 21049; ♀; Tengyueh, Yunnan, 5500 feet altitude; April 24, 1917; R. C. Andrews and Edmund Heller.

Diagnosis.—Closely allied to *Natrix subminiata* of Java and southeastern Asia, from which it is distinguished by a higher number of ventral scales, 160–172, compared with 132–157 in *subminiata* as here restricted.

Dorsal scale rows 19, the outer smooth, the median rows sharply keeled; ventrals 163–172; anal divided; caudals 75–86; upper labials 7–9, three entering the eye; a single preocular; three postoculars; temporals 2–2; general color uniform olive, with reddish markings on the neck, chiefly confined to the skin between the scales.

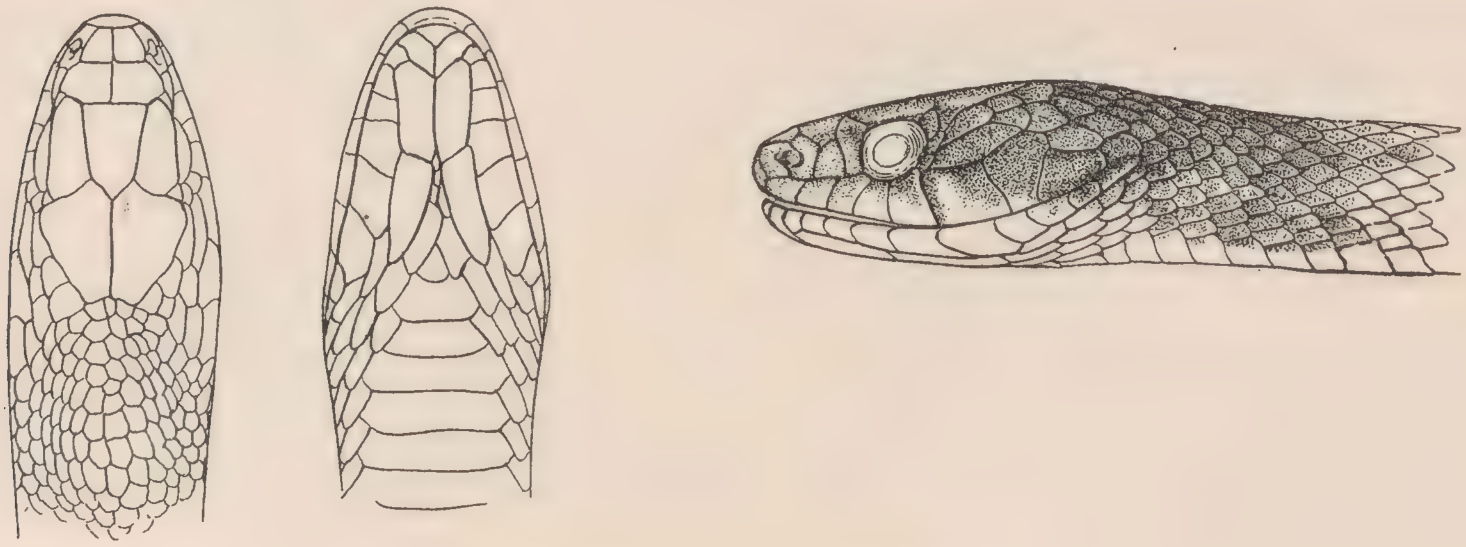

Fig. 11. *Natrix helleri*, new species.
Dorsal, ventral, and lateral views of head of type, natural size.

Description of Type.—Habitus of *Natrix subminiata*. Nineteen subequal maxillary teeth, followed by two strongly enlarged ones. Rostral visible from above; internasals as long as broad, their sutures with the rostral subequal to those of rostral and first labial; internasals slightly shorter than the prefrontals; frontal slightly longer than its distance from the rostral, slightly shorter than the parietal suture; parietals truncate behind; frontal wider than the supraoculars; nasal divided; loreal higher than long; eight upper labials, sixth largest, seventh highest, and the third, fourth, and fifth entering the eye; ten lower labials; a single preocular; postoculars 2–3; temporals 2–2.

Dorsal scales in nineteen rows at mid-body, twenty-two on the neck, and seventeen near the tail, narrow, strongly keeled, and notched at the tip; outer scale row smooth; a pair of faint scale pits, often difficult to discern; ventrals 169; tail incomplete.

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[1] Named for Mr. Edmund Heller, Assistant Curator of Mammals, Field Museum of Natural History.

General color uniform olive, with reddish markings on the neck, chiefly confined to the skin between the scales; lower labials cream; upper labials gray anteriorly and posteriorly, the middle ones lighter, with a black mark on the 5th–6th suture.

Notes on Paratypes.—The five paratypes agree in general with the type; No. 21047, ♀, from the type locality, has 21–19–17 dorsal scales; 165 ventrals; 83 subcaudals; labials 7–8; oculars 1–3; and temporals 2–3. This specimen measures 860 mm., the tail occupying .23 of the total. No. 21048 is from Yungchang, Yunnan; it agrees with the type in having an even number of scale rows on the neck, (twenty); ventrals 172; tail incomplete; labials 8–9; otherwise in complete agreement with the type.

A specimen from Yenping, Fukien, A. M. N. H. No. 23533, ♂, collected November 25, 1921 by H. R. Caldwell agrees excellently with the Tengyueh specimens. It has 172 ventrals, 83 caudals, upper labials 8, lower labials 10, oculars 1–3, and temporals 2–2 and 2–3. The characteristic coloration of the upper labials is present.

Two specimens from the Wutingchow District, Yunnan, collected May 3, 1919 by John Graham, may be placed here. Their ventrals are 160–161, caudals 73–80.

This species has, of course, long been known simply as *Natrix subminiata;* its ventral count is quite different, however, and does not even overlap that of its relative in southeastern Asia, of which considerable numbers are now on record.

Natrix parallela (Boulenger)

Two specimens, A. M. N. H. Nos. 21022 and 21024, collected at Likiang, Yunnan, October, 1916, by R. C. Andrews and Edmund Heller, are tentatively referred to this form. Their scale characters and measurements are as follows:

A. M. N. H. Nos.	21022	21024
Sex	♀	♂
Dorsal Scales	19–17	19–17
Ventrals	170	169
Caudals	69	73
Upper Labials	8	..
Lower Labials	9–11	..
Preoculars	1–1	..
Postoculars	3–3	..
Temporals	2–1–2, 2–1–3	2–2
Total Length	595 mm.	488 mm.
Tail/Total Length	.21	.23

The coloration of No. 21022 is as follows: ground color of venter uniform yellow; ventrals with narrow black tips, and each with a longitudinal black spot on each side, forming an interrupted lateroventral line; outer three scale rows light brown, each scale with a black base; these black markings are emphasized on the lower half of the fourth scale row, and outline an obscure light band on the fourth, fifth, and sixth rows; dorsal area between these rows darker; an obscure light vertebral line on the neck.

Each of these specimens had a number of small fish in its stomach.

Natrix octolineata (Boulenger)

Figure 12

A specimen in the American Museum collection from Tungchuan, Yunnan, was purchased from Rosenberg as *octolineata*. It agrees in coloration with the original description (Boulenger, 1904, p. 133). It has 160 ventrals, 63 caudals, 8 upper labials, 11 lower labials, 2 preoculars, 3 postoculars, and temporals 2–2. It differs somewhat from the type in having two preoculars on each side. On one side it has an irregular subocular cut off from a labial and the loreal united with a third preocular and thus entering the eye.

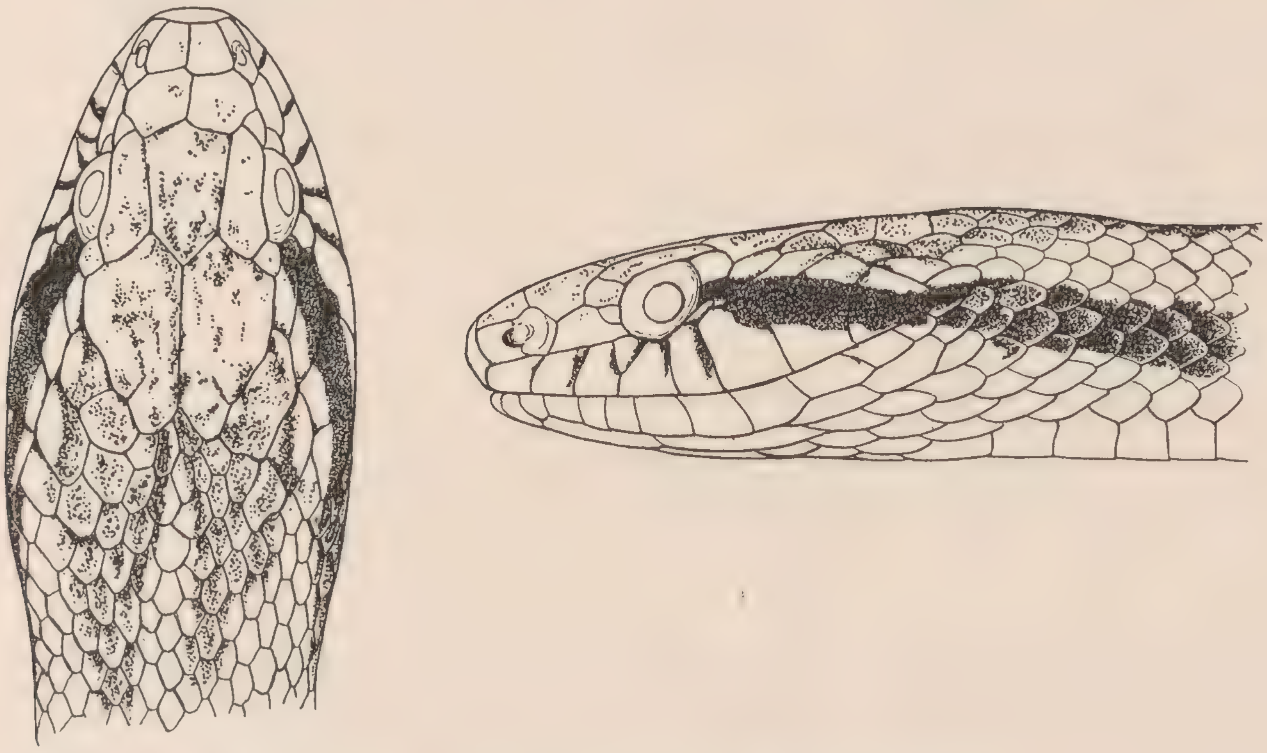

Fig. 12. *Natrix octolineata* (Boulenger).
Dorsal and lateral views of head of A. M. N. H. No. 13595, × 1.5.

Natrix septemlineata, new species

Figure 13

Type.—A. M. N. H. No. 21051; ♂; Tengyueh, Yunnan; May 17, 1917; R. C. Andrews and Edmund Heller.

Diagnosis.—Dorsal scale rows 19, weakly keeled, the outer row smooth; ventrals 159–171; anal divided; caudals 82–89; upper labials 8; one preocular; three postoculars; temporals 2–1–2; venter uniform light, without spots at the ends of the ventrals; back with seven dark longitudinal stripes.

Descriptions of Type.—Body slender, tail about one-fourth of the total; head narrow, elongate; eye rather large.

Rostral barely visible from above, nearly twice as wide as high, its suture with an internasal equal to that with the first labial; internasals as long as wide, shorter than the prefrontals; frontal as long as the parietal suture, slightly longer than its distance from the end of the snout; nasal divided, nostril large, lateral; loreal a little longer than high; one preocular; three postoculars; temporals 2–1–2 and 2–1–3; upper labials 8, the 4th and 5th entering the eye; lower labials 10, five in contact with the anterior chin-shields; second pair of chin-shields slightly longer than the first.

Dorsal scales weakly keeled, in 19–17 rows, the outermost smooth; ventrals 171; anal divided; subcaudals 89.

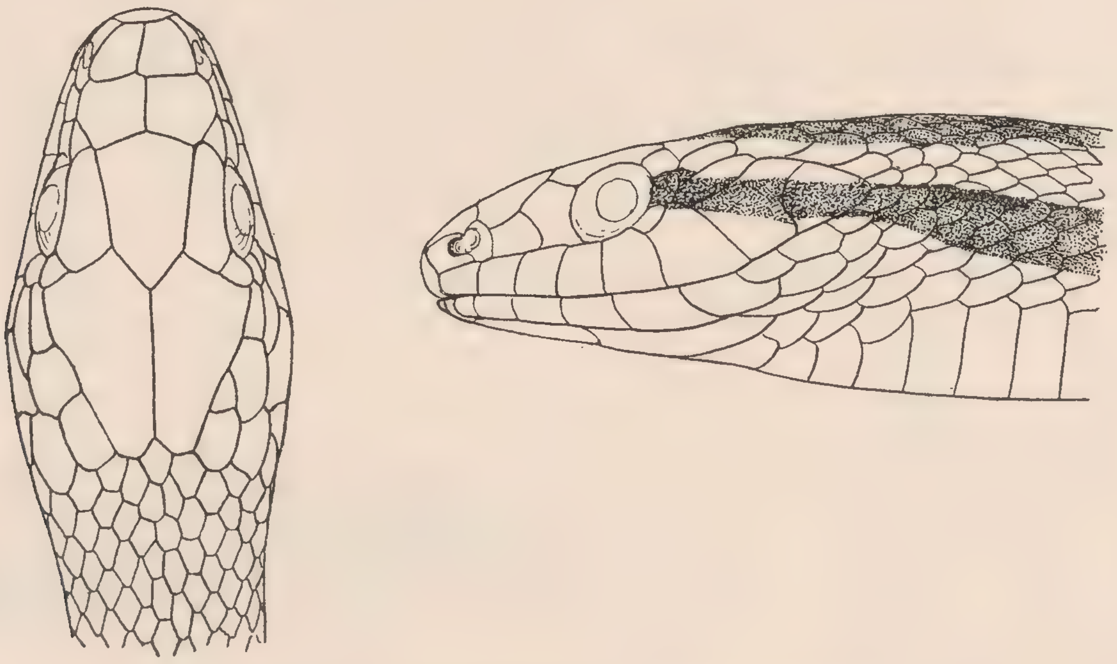

Fig. 13. *Natrix septemlineata*, new species.
Dorsal and lateral views of head of type, × 2.

Venter uniform light fawn; back longitudinally striped; a narrow black line on the tips of the ventrals and the lower edge of the first row of scales; a light fawn-colored band on the first and second rows; a black band on the second, third, and fourth rows; a light band above this on the fifth and sixth rows; dorsal area between these rows dark gray with the margins of the seventh rows and of the vertebral row black, thus forming three additional double black lines; the lateroventral lines and the vertebral line are absent on the neck, which has four sharply defined black bands, of which the lower originate at the eye and the upper on the parietals; labials entirely immaculate, except where the postocular stripe crosses the seventh and eighth.

The type measures 627 mm., tail 165 mm., .26 of the total length.

Notes on Paratypes.—The two paratypes, A. M. N. H. Nos. 21050 and 21052, bear the same data as the type. They agree closely in coloration and scale characters, except that one has only 159 ventrals.

This species is closely allied to *Natrix himalayana* in scale characters, but differs radically in coloration, in which it resembles *Natrix pleurotænia* from Yunnanfu.

Natrix johannis (Boulenger)

Figure 14

A. M. N. H. Nos. 12808, Wutingchow District, and 21076, Yunnanfu, Yunnan, collected by John Graham, represent this species in the American Museum collection.

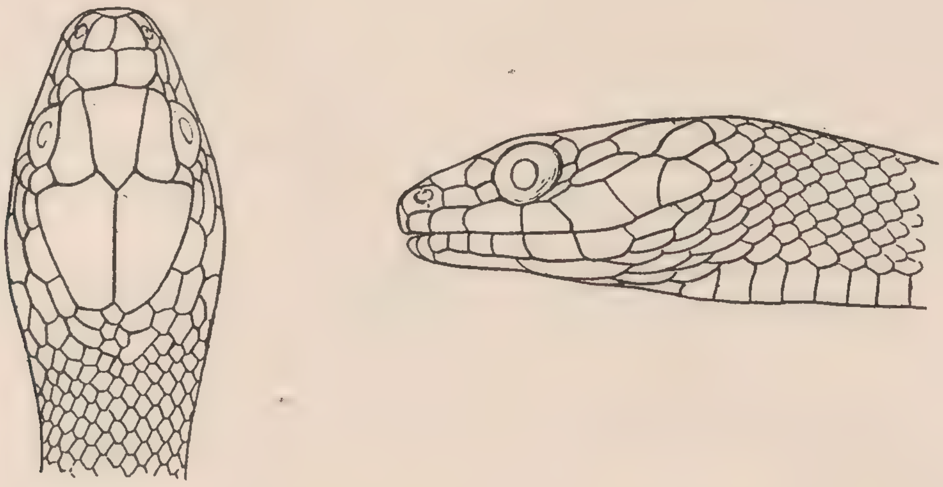

Fig. 14. *Natrix johannis* (Boulenger).
Dorsal and lateral views of head of A. M. N. H. No. 21076, × 2.

These specimens extend the range of ventrals and present some variations from Boulenger's description (1908, p. 244). They agree exactly in coloration. Their scale characters are as follows:

A. M. N. H. Nos.	12808	21076
Sex	♀	♂
Dorsal Scales	21–19–18	20–19–17
Ventrals	161	175
Caudals	85	89
Upper Labials	8	7
Lower Labials	10	9
Preocular	1–1	1–2
Postoculars	2–3	3–3
Temporals	1–2, 2–2	2–1
Total Length	470 mm.	380 mm.
Tail/Total Length	.26	.26

Pseudoxenodon macrops (Blyth)

Two specimens, A. M. N. H. Nos. 21033 and 21074, Tengyueh, May, 1917, R. C. Andrews and Edmund Heller.

These two specimens might be identified with *P. sinensis* Boulenger, as their scale counts fall just at the upper limit of variation in the latter. Their locality is intermediate between the ranges of the two forms, and additional specimens may unite them as subspecies. The characters of the two Tengyueh specimens are as follows:

A. M. N. H. Nos.	21033	21074
Sex	♂	♀
Dorsal Scales	17–19–15	19–19–15
Ventrals	154	164
Subcaudals	71	67
Upper Labials	7	7
Lower Labials	8	8
Preoculars	1	1
Postoculars	3	2–3
Temporals	2–2	2–3
Length	700 mm.	370 mm.
Tail/Length	.23	.20

Pseudoxenodon sinensis Boulenger

Twenty-two specimens of this species, A. M. N. H. Nos. 5270, 8915, 12790–12798, 17398–17401, 17703, 18081, 21077–21081, were purchased by The American Museum of Natural History from the Rev. John Graham, all collected near Yunnanfu, Yunnan.

In this series, the dorsal scale count is uniformly 19–17–15, with 19 rows at mid-body; the upper labials are 7, with a single exception, in which they are 8 on one side; the lower labials are 8 or 9; the preocular is invariably single; postoculars invariably 3; anterior temporals invariably 2; second row of temporals 1–3.

Summary of Ventrals, Caudals and Tail/Length

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
Ventrals	♂	8	138–146	144
	♀	14	149–162	155
Caudals	♂	7	60– 68	62
	♀	14	57– 66	61
Tail/Total Length	♂	7	.18–.22	.20
	♀	14	.19–.20	.19

Pseudoxenodon dorsalis (Günther)

A. M. N. H. No. 21014, Yenping, Fukien, 1916, collected by H. R. Caldwell.

This specimen differs notably from the type of *dorsalis* in both scale characters and coloration, and agrees closely with the series from Formosa described by Steindachner as *Pseudoxenodon macrops* (1914, p. 327, Pls. III–IV, text figs. 5–7). It differs from all of the species described in having an immaculate venter. Its dorsal pattern is more distinct than that of *dorsalis* or of the Formosan specimens, doubtless accounted for, however, as a juvenile color phase. It differs from *P. stejnegeri* Barbour in having a single preocular and a different coloration. Altogether, the status of the Formosan and Fukien *Pseudoxenodons* is far from clear. Werner (1909, p. 214) describes two specimens from Canton and locality unknown, which have ventrals 131–143, caudals 52 58, and dorsals at mid-body 17–19.

In the present specimen there are 24+5 light dorsal spots, a little wider than long, each of which is bordered by black, and accompanied by a black lateral bar which extends from the border of the spots to the ventrals. The top of the head is immaculate; a broad black nuchal marking begins just behind the parietals, forks, and extends to the ninth ventral. Fourth, fifth, sixth, and seventh upper labials with small black spots at their posterior margins.

A singular anomaly consists in the fusion of the loreal and posterior nasal on each side. The scale characters and measurements of this specimen and of the type of *dorsalis* are as follows:

	A. M. N. H.	
Museum Number	21014	B. M.
Sex	♀	♀
Dorsal Scales	19–17–15	17–15
Ventrals	153	140
Caudals	56	51
Upper Labials	8	8
Lower Labials	9	..
Preoculars	1	1
Postoculars	3	2–3
Temporals	2–2	2–2
Total Length	243 mm.	610 mm.
Tail/Total Length	.18	.17

Pseudoxenodon bambusicola Vogt

A single specimen, purchased at Wuhu, Anhwei, by Clifford H. Pope, 1922, is A. M. N. H. No. 23527.

The type locality of this species is "Mountains of the Hunan and Kiangsi border (of Kwantung), 600 to 900 meters altitude." The present specimen, a male, has dorsal scales 19–17–15; ventrals 131; anal divided; subcaudals 51; upper labials 8, the 4th and 5th entering the eye; lower labials 9; oculars 1–2; temporals 2–2; total length 339 mm., tail 60 mm., tail/length .18.

Zaocys dhumnades (Cantor)

Twenty-five specimens, A. M. N. H. Nos. 23540, 24504–24506, 24510–24523, 24544–24548, 24594–24595, from Ningkwo, Anhwei, collected by Clifford H. Pope, September–October, 1921.

The scaling of the head is equally invariable and almost identical with that of *Z. nigromaculatus.* A number of specimens in this series being skins, the sex consequently indeterminable, and their being no apparent difference in scale characters in the sexes, I have combined the data for the two sexes in the following tabulation.

Summary of Measurements and Scale Characters

	Sex	No. of Specimens	Extremes	Average
Ventral Plates	♂+♀	25	186–197	192
Subcaudals	♂+♀	9	105–118	113
Length	♂+♀	8	452–1258 mm.	. . .
Tail/Length	♂+♀	8	.26–.30	.28

Zaocys nigromarginatus (Blyth)

Eight specimens agree with Boulenger's diagnosis of this species: A. M. N. H. Nos. 21001, 21002, 21059, 21060, Tengyueh, Yunnan, May, 1917, collected by R. C. Andrews and Edmund Heller; and 23496, 23502, Luanshikau, 3000 feet altitude, Wanhsien, Szechwan, September, 1921; and 23503, 23510, Wanhsien, Szechwan, December, 1921, collected by Walter Granger.

I find no differences between the Yunnan and the Szechwan specimens. The dorsal scales are uniformly 16–14; the upper labials invariably 8; the preoculars and postoculars 2–2; the temporals 2–2; and the lower labials are 10 with an occasional 9.

Summary of Measurements and Scale Characters

	Sex	No. of Specimens	Extremes	Average
Ventral Plates	♂	8	197–202	199
Subcaudals	♂	4	123–131	127
Length	♂	5	1505–1915 mm.	1710 mm.
Tail/Length	♂	4	.28–.31	.30

Coluber spinalis Peters

Plate XXVIII, Figure 1

Seven specimens in the collection: A. M. N. H. Nos. 21470, 26 miles south of Hsing Lung Shan, Eastern Tombs, Chihli, August, 1921, Clifford H. Pope; 23921–23922, Mai Tai Chao, Shansi, May, 1922, C. H. Pope; 28257, 28266, Chen Tzu, Taiyuan, Shansi, July–August, 1922, Clifford H. Pope; 28261, 28284, So Huang, Ping Ting, Shansi, September 4–15, 1922, Clifford H. Pope.

The dorsal scales are 17–15, except in one specimen which has 17–16–14. The ventrals range from 190 to 195 in four males, 197 to 209 in three females; the caudals from 98 to 103 in males, 88 to 99 in females. Upper labials uniformly 8, lower labials 9 or 10. Preoculars uniformly 2, the postoculars 2 with a single exceptional 1. Temporals 2–3 or 2–2. The range in length is from 280 mm. to 944 mm. The tail/length varies from .25 to .27 of the total in females, .25 to .29 in males.

It is interesting to note that the juvenile specimen shows no signs of crossbars, which are so characteristic of the supposed congeners of this form in North America.

Ptyas korros (Schlegel)

Two specimens, A. M. N. H. Nos. 21046, Fukien Province, 1916, R. C. Andrews and Edmund Heller, and 23521, Yenping, Fukien, 1921, H. R. Caldwell, represent this species. They afford no noteworthy variation from the Hainan series collected by Clifford H. Pope.

Lycodon fasciatus (Anderson)

A. M. N. H. No. 12799, Yunnanfu, Yunnan, February, 1919, John Graham, much extends the range of this form, which has recently been described and figured by Wall (1911, p. 948, Pl. xv, map).

This specimen has 195 ventrals and 70 caudals, compared with a minimum of 200 and 74, respectively, given by Wall. Otherwise it evidently agrees with the Burman specimens of this species. Additional specimens from Yunnan might establish the existence of a subspecific form in this area.

Dinodon rufozonatum rufozonatum (Cantor)

Twenty-six specimens represent this most strikingly colored of Chinese snakes, all collected by Clifford H. Pope. These are distributed as follows: A. M. N. H. Nos. 21473–21474, 26 miles south of Hsing Lung Shan, Eastern Tombs, Chihli, August 12, 1921; 28256, Niangtzekwan, Shansi, September 15–18, 1922; 28267, 28329–28334, Chen Tzu, Taiyüan Shansi, July–August, 1922; 23488, 24529, 24531, 24551–24557, 25573–25575, Ningkwo, Anhwei, October, 1921; 24624, 24654, Wuhu, Anhwei, September–October, 1921.

It is natural to compare the Chihli and Shansi series with the specimens from Anhwei, and some differences are apparent. Thus the loreal enters the eye in 69% of the Anhwei series and only in 35% of the northern specimens. The number of light crossbars is fewer on both body and tail in the northern series, but the extremes overlap; the figures are as follows:

		DORSAL LIGHT BARS	CAUDAL LIGHT BARS
Anhwei Series, 14 Specimens	Extremes	50–70	14–26
	Average	61	20
Chihli and Shansi Series, 9 Specimens	Extremes	46–63	12–20
	Average	56	17

When these series are analyzed for sex differences, the numbers of specimens are too small to give conclusive results on the degree of geographic variation.

Most of the scale characters of this species are extremely constant. The dorsal scales are uniformly 19–17–15 in the Anhwei specimens, 19–17–15 in five of the northern specimens, 17–15 in five. Undivided subcaudals appear as an anomaly, No. 28256 having eight subcaudals entire.

Summary of Measurements and Scale Characters

	SEX	NO. OF SPECIMENS	EXTREMES	AVERAGE
			Anhwei Series	
Ventral Plates	♂	5	196–200	199
	♀	8	196–205	201
Subcaudals	♂	3	69– 84	75
	♀	8	65– 73	68
Length	♂	3	241–971 mm.	. .
	♀	8	507–991 mm.	778 mm.
Tail/Length	♂	3	.18–.21	.19
	♀	8	.17–.19	.18
		Chihli and Shansi Series		
Ventral Plates	♂	6	192–200	195
	♀	4	188–197	191
Subcaudals	♂	6	66– 74	70
	♀	3	60– 68	65
Length	♂	5	770–1023 mm.	876 mm.
	♀	3	784– 888 mm.	824 mm.
Tail/Length	♂	5	.17–.19	.18
	♀	3	.17–.18	.17

Dinodon rufozonatum williamsi,[1] new subspecies

Figure 15

Type.—A. M. N. H. No. 17453; ♀; Changsha, Hunan, China; July, 1920; J. W. Williams.

Diagnosis.—Distinguished from *Dinodon rufozonatum* by a greater number of ventrals, subcaudals, and transverse dorsal markings.

Description of Type.—Body stout, head short, depressed, tail moderate; eye small, with the pupil shortly elliptic, directed somewhat upwards ; a strong ventral angle.

Rostral well visible from above; internasals broader than long, about half as long as the prefrontals; frontal as wide as long, as long as its distance from the rostral and as long as the parietal suture; parietals six-sided, bordered by three temporals, of which the last is the largest; loreal elongate, entering the eye on both sides; a small preocular; two postoculars; temporals 2–2; upper labials eight, 3rd, 4th, and 5th entering the eye on both sides; lower labials eleven, five in contact with the anterior chin-shields.

Dorsal scales entirely smooth anteriorly, weakly keeled on the upper rows on the posterior fourth of the body, in 18–17–15 rows; ventrals 207; subcaudals 81.

Ground color above very dark brown, with eighty-seven light fawn crossbars, each about one scale-length in width, about half as wide as the dark interspaces; the light scales punctate with dark brown; the two colors mixed on the sides, which are without regular markings; upper head-shields are of the ground color with light margins; sides of head light with a dark postocular band to the angle of the mouth and a temporal stripe from the parietals to the neck; venter immaculate, between the lateral angles, light yellow; ends of ventrals, outside the angle, with a large brown spot, sometimes indistinct; tail darker beneath, especially toward its tip.

The total length is 1190 mm., tail 218 mm., .18 of the total.

Notes on Paratypes.—Five paratypes in the Williams collection from Changsha are A. M. N. H. Nos. 17437, 17439, 17440, 17443, and 17450. Four of these have nineteen scale rows at mid-body. The ventrals and caudals in three females are 207, 212, 213, and 86, 77, 78; in two males 211, 211 and 78, 84. Upper labials uniformly eight; lower labials ten except in one specimen which has 11–12; oculars 1–2; temporals 2–2 or 2–3; loreal excluded from the eye on one side in one specimen. The dorsal crossbars range from 59 to 74 on the body and from 21 to 26 on the tail.

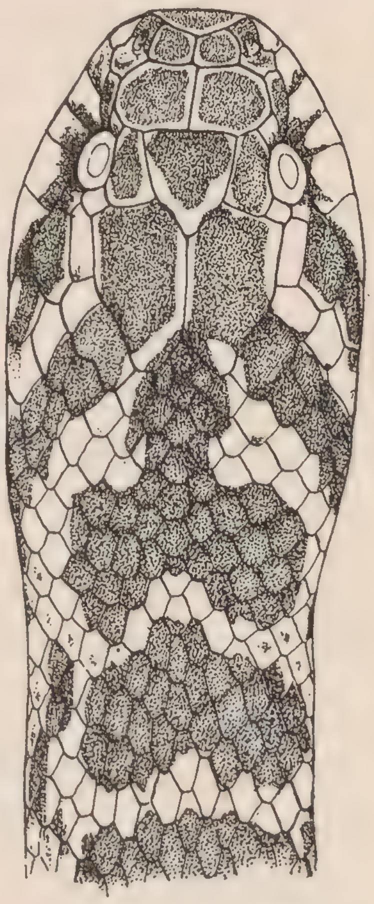

Fig. 15. *Dinodon rufozonatum williamsi*, new species.
Dorsal view of head of type, natural size.

The ventral count in this form is decidedly higher than in the series of *rufozonatum* examined by me, and is reached in only one recorded specimen (from Korea) which has 208 ventrals; the subcaudals average more, and the dorsal crossbars are decidedly more numerous. The Anhwei and Shansi and Chihli specimens have a more "contrasty" coloration, the light crossbars extending farther down on the sides, and have more red in the pattern. The ventral angle is very sharply defined in the Hunan series. It is surprising that the Kiukiang specimens in the British Museum do not correspond with the Changsha form.

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[1] Named for Mr. J. W. Williams of the College of Yale-in-China, Changsha, Hunan.

Elaphe schrenckii Strauch

Nine specimens, A. M. N. H. Nos. 21484–21492, collected at Hsing Lung Shan, Eastern Tombs, Chihli Province, August, 1921, by Clifford H. Pope.

The dorsal scale count varies from 21–19 to 25–23–21–19 and 23–21–19–17. Eight upper labials are normal, seven occurring once. The lower labials range from nine to eleven. The preoculars are two six times and one twelve times. The postoculars are two fifteen times and one three-times. A single anterior temporal occurs three times, two in the remaining cases. The second row of temporals varies from one to four.

The maximum length reaches 1365 mm., and a specimen of 472 mm. is so strikingly different in coloration that it offered some difficulty in identification. The juvenile pattern of this specimen consists of a dark brownish gray ground color, with about thirty-one light crossbands on the body, two to three scales wide, sharply defined anteriorly by narrow white borders and by the black borders of the intermediate brown spaces. Posteriorly the contrast diminishes and the brown and light brown cross bands become equal, the dark borders remaining distinct. The venter is light, heavily spotted with black. The chin and upper labials cream color. Labials, rostral, and mental with narrow black posterior edges. A black band from the eye to the angle of the mouth, bordered above by a light band which extends obscurely across the supraoculars and frontal to join its fellow. A ⅄ shaped nuchal light mark behind this, its apex at the posterior edge of the parietals.

The adult coloration is uniform olive-brown above, with obscure black bars on the sides of the neck and black crossbands arranged in pairs on the posterior third of the back, very faint on the sides. About sixteen black crossbands on the tail, the first ten in pairs. The contrast of adult and juvenile color patterns is in some degree a parallel to that of the African water snakes of the genus *Grayia* (Boulenger, 1909, Proc. Zoöl. Soc. London, p. 944, Figs. 296–298).

Summary of Measurements and Scale Characters

	Sex	No. of Specimens	Extremes	Average
Ventral Plates	♂	4	206–216	212
	♀	4	220–222	221
Subcaudals	♂	4	70– 77	74
	♀	4	64– 72	69
Tail/Length	♂	4	.16–.18	.17
	♀	4	.15–.17	.16

The pattern development from juvenile to adult has been described by both Boulenger and Stejneger.

Elaphe carinata Günther

This highly interesting species is represented by a single specimen, A. M. N. H. No. 21043, Tengyueh, Yunnan, May 10, 1917, R. C. Andrews and Edmund Heller.

The dorsal scales, strongly keeled except the outermost row, are in 23–21–19–17 rows; ventrals 223; anal divided; subcaudals 82; upper labials 8; lower labials 10; preoculars 2; postoculars 2–3; temporals 2–3 and 2–6; total length 1595 mm.; tail/total length .17.

The pattern is distinctive, though complicated. Anteriorly there are black crossbands, somewhat obscured by their scales having light centers, on the first half of the body; posteriorly the scales are brown, each with a black border. There are obscure longitudinal lines of black on the neck.

It seems likely that *Elaphe halli* (Boulenger) is directly related to this species. A. M. N. H. No. 21472, a skin without head, brought to Mr. Pope at Hsing Lung Shan, Chihli, either represents a transported specimen of *carinata* or may be a mutilated *Elaphe halli*, whose type locality is Chifeng, northeast Chihli. A second specimen of *carinata*, No. 22702, from Yunnanfu, Yunnan, agrees closely with the one described.

Elaphe mandarina (Cantor)

Three specimens, A. M. N. H. Nos. 23500, 23504, Yenchingkau, 1500 feet altitude, Wanhsien, Szechwan, October, 1921, Walter Granger, and 24622, bought at Wuhu, Anhwei, by Clifford H. Pope, 1922.

The dorsal scales are in 23–21–19 rows; ventrals vary from 212 to 231; subcaudals from 67 to 70; upper labials 7; lower labials 9 in one specimen, 10 in two; preanal postoculars 1–2 in all three; temporals variable, 1–2 to 2–3; dorsal dark crossbars on body and tail 24+8 to 27+11. The largest specimen, a male, measures 1175 mm., the tail amounting to .18 of the total.

The Szechwan specimens present a well-marked color variation, the lateral spots being united with the dorsal markings to form complete crossbands, each of which encloses a light spot dorsally.

Elaphe porphyracea porphyracea (Cantor)

Three specimens, A. M. N. H. Nos. 21065–21067, Tengyueh, Yunnan, May, 1917, collected by R. C. Andrews and Edmund Heller.

The principal characters of this series may be tabulated as follows:

A. M. N. H. Nos.	21065	21066	21067
Sex	♀	♀	♂
Dorsal Scales	19–17	19–18	19–17
Ventrals	190	196	198
Subcaudals	48	52	54
Upper Labials	7	7	8
Lower Labials	9	9	11
Preanal Postoculars	1–2	1–2	1–2
Temporals	0–2	0–2	1–2
Length	815 mm.	289 mm.	784 mm.
Tail/Length	.14	.14	.15
Dorsal Crossbands+Those on Tail	13+0	15+3	15+4

These specimens differ from the two Hainan specimens at hand in having shorter tails, with fewer subcaudals, and a larger number of dorsal crossbands. The Hainan specimens appear to represent *Elaphe nigrofasciata* (Cantor), type locality Singapore, and typical *porphyracea* are intermediate between *nigrofasciata* and the Yunnan form described below.

Elaphe porphyracea pulchra, new subspecies

Figure 16

Type.—A. M. N. H. No. 17705; ♂; 20 miles North of Yunnanfu, Yunnan; July 6, 1920; John Graham.

Diagnosis.—Closely allied to *Elaphe porphyracea porphyracea* in pattern; distinguished by having fewer ventrals, 177–185, and subcaudals, 51–56.

Description of Type.—Habitus undifferentiated; rostral wider than high, just visible from above; internasals three-fourths as long as the prefrontals; frontal slightly longer than its distance from the rostral, as long as the parietal suture, a little longer than wide; loreal small, a little longer than high; one preocular; two postoculars; temporals 1–2; upper labials 8, the 3rd and 4th entering the eye; lower labials 9, the first four in contact with the anterior chin-shields, which are about twice as long as the posterior; dorsal scales in 19–17 rows, nearly smooth; ventrals 177; subcaudals 54.

Venter uniform pale yellow; dorsum grayish fawn, with fourteen dark transverse markings on the body and four on the tail; these markings, which are narrowly margined with yellow, consist of a pair of black lines meeting below at the ends of the ventrals and enclosing an area of the dorsal ground color one and a half scale-lengths broad; a pair of black longitudinal dorsolateral lines begins between the tenth and eleventh crossbands on the seventh and eighth scale-rows; at first discontinuous, these lines become more sharply defined and broader posteriorly, where they lie on the sixth and seventh scale rows, and continue to the end of the tail; head with a black median stripe from the internasal suture to the first dorsals, and a pair of dorsolateral stripes from the eyes to the first crossband on the nape.

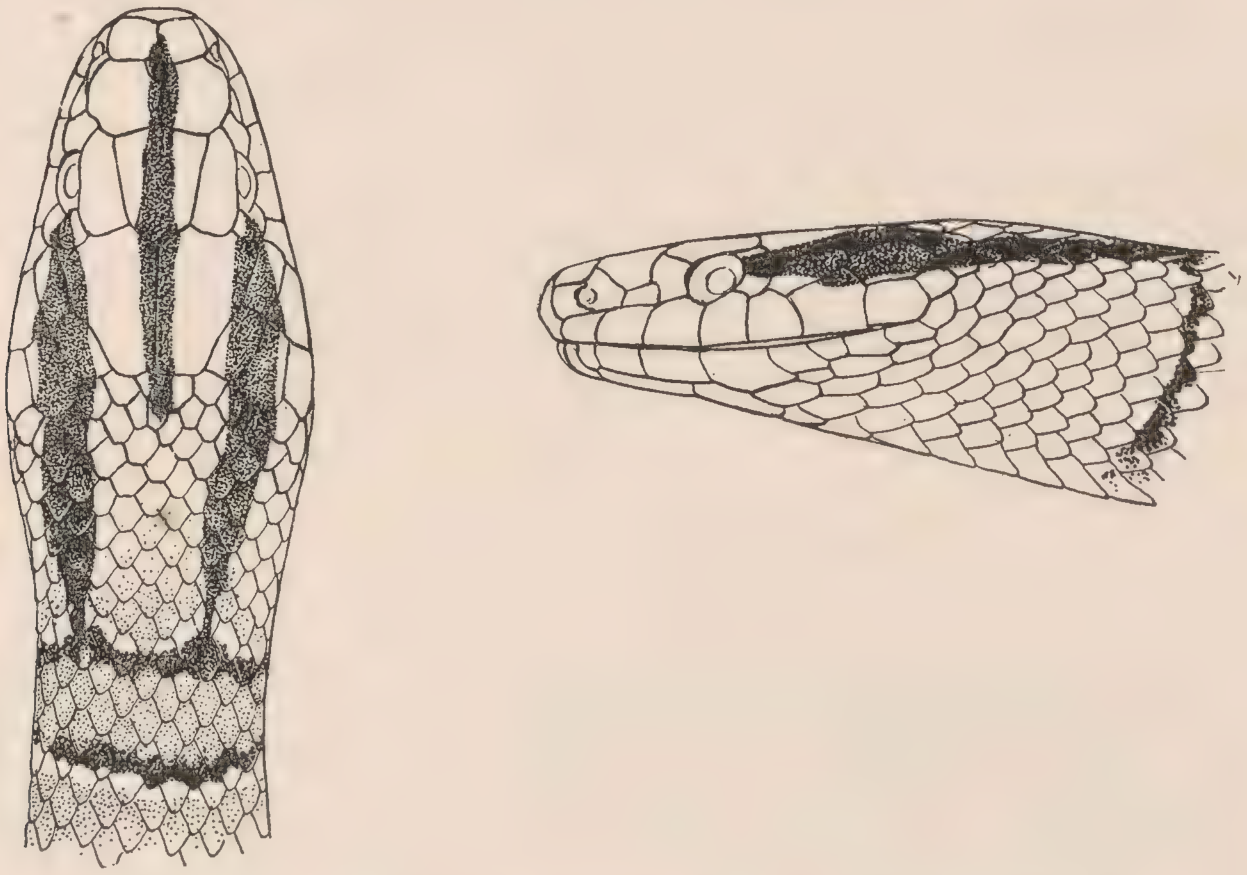

Fig. 16. *Elaphe porphyracea pulchra*, new subspecies.
Dorsal and lateral views of head of type, × 1.3.

Total length 583 mm., tail 103 mm., .18 of the total.

Notes on Paratypes.—The three paratypes are female specimens, all from Yunnanfu, A. M. N. H. Nos. 17396, 22704, 22705. Their ventrals are 181, 185, 185, subcaudals 56, 55, 51. Two have eight upper labials, the other seven. One has nine lower labials, one 9–10, and one 10–10. No other variation in head shields.

In coloration the two adults agree closely with the type, with 12+3 and 13+3 crossbands. No. 17396, measuring 302 mm., has solid black crossbands, the last two exactly alternate, stopping at the vertebral line; the dorsolateral lines begin between the 7th and 8th crossbands; there are small black spots just halfway between the crossbands, on the second scale row.

The tail length in the three specimens is .16 of the total once and .17 twice.

Elaphe rufodorsata (Cantor)

Thirty-five specimens of this species collected by Clifford H. Pope in Anhwei; A. M. N. H. Nos. 23539, 24631–24639, 24641,–24653, Wunu, September–October, 1921; 24501–24503, 24532, 24550, 24559–24561, 24563–24566, Ningkwo, September–October, 1921.

It is remarkable that this entire series fails to show a deviation from the dorsal scale formula 21–19–17. The preoculars and postoculars are also constantly 1–2. The upper labials are seven, with six exceptions, in which they are eight. The lower labials range from nine to eleven, ten on both sides in thirty specimens. The temporals are normally 2–3, but are occasionally single in the first row, and range from one to four in the second.

The largest male measures 555 mm., the largest female 755 mm.

Summary of Measurements and Scale Characters

	Sex	No. of Specimens	Extremes	Average
Ventral Plates	♂	14	163–172	166
	♀	21	173–182	177
Subcaudals	♂	14	56–63	60
	♀	20	49–53	51
Tail/Length	♂	14	.18–.21	.20
	♀	20	.15–.18	.16

Elaphe dione (Pallas)

Plate XXVIII, Figure 2

Sixty-four specimens of *Elaphe dione*, all collected by Clifford H. Pope except as noted, are from the following localities: A. M. N. H. Nos. 21479–21480, 13 miles north of Hsing Lung Shan, Chihli, August, 1921; 21481–21483, Hsing Lung Shan, Chihli, August, 1921; 23923–23934, 24142, 28258, Mai Tai Chao, Shansi, May 6, 1922; 28259–28260, 28285–28295, So Huang, Ping Ting, Shansi, September, 1922; 28263–28266, 28296–28313, Chen Tzu, Taiyuan, Shansi, July–August, 1922; 28269–28277, Tsing Glo, Shansi, August, 1922; 28283, Inner Mongolia, 260 miles s.e., of Sairusu on the Kalgan Trail, R. C. Andrews, 1922.

These specimens agree excellently with Stejneger's account of this species. The single specimen from Inner Mongolia is a very pale one, but it can be matched by many of the Shansi specimens.

Summary of Scale Characters and Measurements (Shansi Series)

	Sex	No. of Specimens	Extremes	Average
Ventrals	♂	22	177–193	183
	♀	29	188–207	197
Subcaudals	♂	21	69– 78	73
	♀	27	60– 72	67
Tail/Length	♂	21	.20–.24	.22
	♀	27	.16–.20	.18

The largest size is reached by a female 1104 mm. in length. The largest male measures 883 mm.

The five specimens from Chihli have a maximum subcaudal count of 79, otherwise falling within the limits of the Shansi series. The Mongolian specimen is close to the average of the Shansi specimens in scale characters.

Three specimens from Ningkwo, at first identified with *Elaphe dione*, appear to require recognition as a distinct form.

Elaphe bimaculata, new species

Figure 17

Type.—A. M. N. H. No. 24640; ♀; Ningkwo, Anhwei; September–October, 1921; Clifford H. Pope

Diagnosis.—Closely allied to *Elaphe dione*, from which it is distinguished by color characters. Dorsal scales 25; ventrals 188–207; subcaudals 67–74; transverse dorsal spots dumb-bell-shaped, often separated as a pair of spots; several of these spots unite on the neck and are confluent with the head marking; tail with a light median and dark dorsolateral stripes.

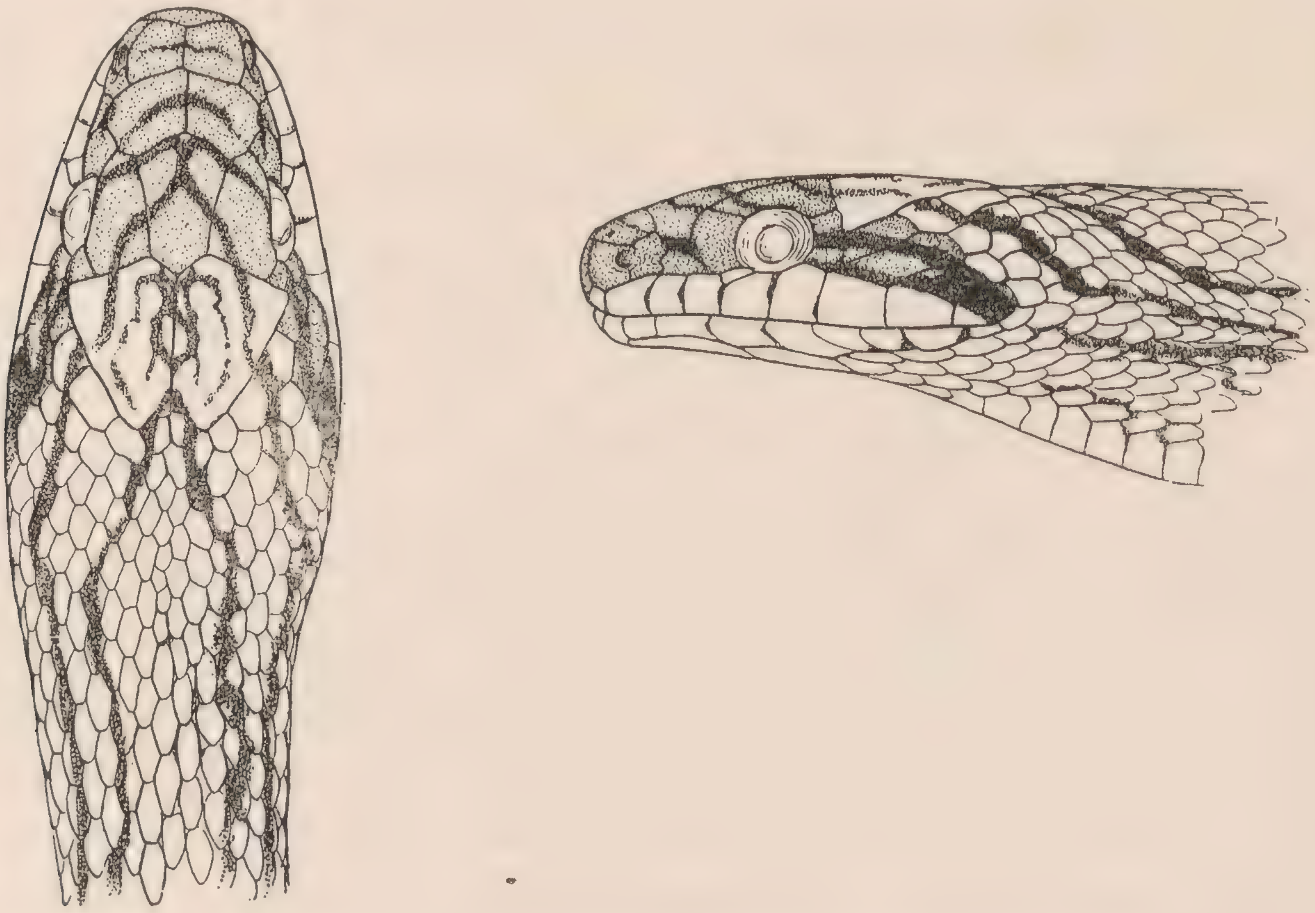

Fig. 17. *Elaphe bimaculata*, new species.
Dorsal and lateral views of head of type, × 1.5.

Description of Type.—Rostral broader than high, visible from above; internasals a little broader than long, their suture more than half the length of the prefrontal suture; prefrontals broadly in contact with the supraoculars; frontal as long as its distance from the snout, shorter than the parietals, much broader in front than behind; nostril between two nasals; loreal small, longer than high; two preoculars, of which the lower is a subpreocular; two postoculars; temporals 2–3; upper labials 8, the fourth and fifth entering the eye; lower labials 9–10; anterior chin-shields longer than the posterior; dorsal scales 25–23–21–19, the first reduction occurring behind the middle of the body; dorsal scales smooth anteriorly, feebly keeled posteriorly; ventral plates 200; subcaudals 74.

Brownish gray above, with transverse darker dumb-bell-shaped markings, sharply outlined with black. These in some places are separated into a pair of spots, and posteriorly they become indistinct; a series of lateral spots alternate with the dorsal series, also outlined with black; a light mid-dorsal line, with less distinct lateral lines, appear on the posterior part of the body, and these become sharply defined on the tail; venter gray with numerous small darker maculations. Head markings sharply defined; a faint black line from eye to eye crossing on the internasals; a pair of black lines from eye to eye on the prefrontals and anterior border of the frontal; a postocular black band to the angle of the mouth, enclosing a brown area next the eye; head and neck with a closed, black-margined figure which has its apex on the frontal and extends backward to about the fifteenth ventral, enclosing dark maculations on the parietals; the neck marking evidently consists of two or three confluent dorsolateral spots; lateral spots on he neck similarly united into a line.

The total length is 770 mm., of which the tail occupies 154 mm., or .20 of the total.

Notes on Paratypes.—A. M. N. H. No. 24549, also from Ningkwo, a juvenile female, has 207 ventrals and 67 subcaudals. No. 24562, from the same locality, is an adult male, with 188 ventrals and 73 subcaudals. Both have a dorsal color pattern identical with that of the type. In No. 24562 the venter is nearly uniform light gray.

It seems barely possible that this is the form referred to as *Elaphe conspicillata* by Werner (1904, p. 357) and by Stanley (1914, p. 28). Although closely allied to *dione*, it seems to be a perfectly distinct form.

Elaphe tæniura tæniura (Cope)

Fifteen specimens of this form all collected in Anhwei, September–October, 1921, by Clifford H. Pope: A. M. N. H. Nos. 24507–25509, 24567, at Ningkwo; 24607–24616, 24625, at Wuhu.

In a former paper I have considered a Hainan specimen of *Elaphe tæniura* as *Elaphe tæniura vaillanti*, which I believe to be a recognizable subspecies in Hainan and S.E. Asia. The type locality of *E. tæniura* is Ningpo, and the present series may be regarded as representative of the typical subspecies. They differ from *vaillanti* and from *yunnanensis* in having a decidedly lower number of ventral plates.

The dorsal scales range from 23–21–19–17 to 25–23–21–19; the lower labials range from 10 to 13, 12 most frequent; the upper labials are usually 8 or 9; one specimen lacks the subpreocular on one side; postoculars invariably 2; temporals 1–2 to 2–5, usually 2–3.

Summary of Scale Characters and Measurements

	Sex	No. of Specimens	Extremes	Average
		Elaphe tæniura tæniuara (Cope)		
Ventral Plates	♂ + ♀	15	225–245	236
Subcaudals	♂ + ♀	13	84–101	95
Tail/Length	♂ + ♀	10	.19–.21	.20
		Elaphe tæniura yunnanensis (Anderson)		
Ventral Plates	♂ + ♀	8	240–254	249
Subcaudals	♂ + ♀	9	90–108	97
Tail/Length	♂ + ♀	7	.18–.22	.20
		Elpahe tæniura vaillant (Mocquard)		
Ventral Plates	♂ + ♀	2	256–259	258
Subcaudals	♂ + ♀	2	106–120	113
Tail/Length	?	1	.24	.24

Elaphe tæniura yunnanensis (Anderson)

Nine specimens: A. M. N. H. Nos. 21003–21005, Tengyueh, Yunnan, May, 1917, R. C. Andrews and Edmund Heller; 21006, Shaowu Fukien, summer, 1916, R. C. Andrews and Edmund Heller; 21007–21009, South China (probably Tengyueh), 1916–1917, R. C. Andrews and Edmund Heller; and 23497, 23511, Wanhsien, Szechwan, December, 1921, Walter Granger.

This form differs from *Elaphe tæniura tæniura* in a number of overlapping characters. The dorsal scales are somewhat fewer both at mid-body and posteriorly, 23 occurring at mid-body in the South Chinese specimens in 66%, 25 in the Anhwei specimens in 73%. The subpreocular is wanting in five out of nine specimens of *yunnanensis*, very rarely absent in *t. tæniura*. The ventrals, subcaudals and proportionate tail length are compared with *tæniura* and *vaillanti* in the tabulation above.

Slight differences distinguish the two Szechwan specimens, which have a slightly higher number of dorsal scales, of subcaudals (103–108) and the subpreocular present in both.

The specimens recorded by Boulenger from the "Western Hills of Pekin" offer some difficulty to my subspecific arrangement, as one of the three specimens has 255 ventrals. The specimens recorded by Stejneger from the Amur Province and from Korea, however, have 229 and 231 ventrals, and thus agree with our Anhwei series and help to maintain the lower average.

The two specimens recorded from Darjeeling by Boulenger evidently may be referred to *yunnanensis*.

It seems decidedly preferable to bring the Riu Kiu *Elaphe schmackeri* into the present "Formenkreis." It appeals most directly to *vaillanti*, but is apparently well distinguished by the frequent occurrence of 27 dorsal scale rows.

Elaphe osborni,[1] new species

Figure 18

Type.—A. M. N. H. No. 21073; ♀; Tengyueh, Yunnan; May 10, 1917; R. C. Andrews and Edmund Heller.

Diagnosis.—Most closely allied to *Elaphe hodgsoni* (Günther), and *E. tæniura* Cope.

Body form not specialized, ventrals not angulate, head distinct from neck; dorsal scales faintly but sharply keeled, in 21 rows; ventrals 215–225; anal divided; subcaudals 77–79,; supralabials 8, 4th and 5th entering the eye; preoculars 2; postoculars 2; temporals 2–3. Color fawn, with black transverse bars anteriorly and longitudional lines posteriorly; no black line through the eye.

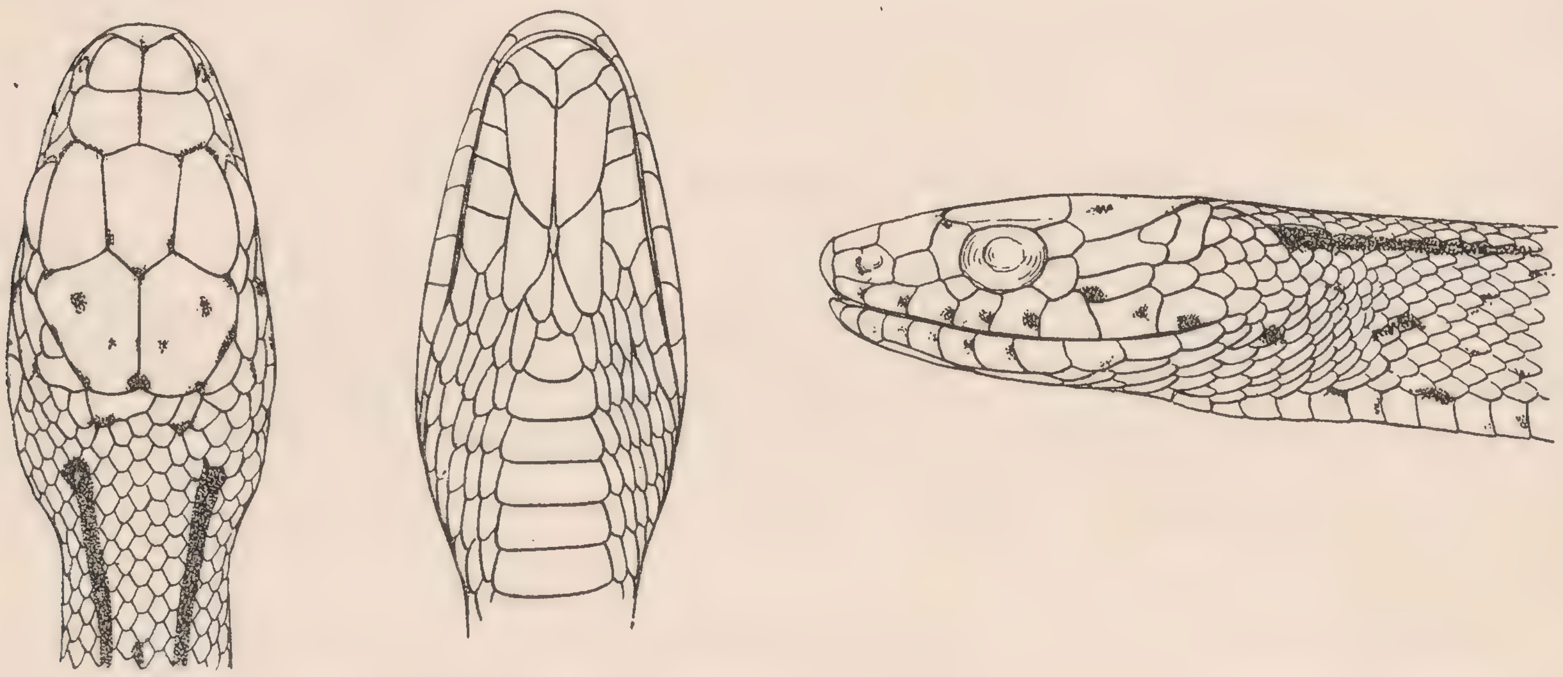

Fig. 18. *Elaphe osborni*, new species.
Dorsal, ventral, and lateral views of head of type, × 1.5.

Description of Type.—Habitus little specialized, ventrals not angulate, head distinct from neck. Maxillary teeth 15, subequal.

Rostral well visible from above, wider than high; internasals a little shorter than the prefrontals; frontal as long as its distance from the tip of the snout, as long as the parietal suture, parallel sided; nasal elongate, the nostril moderate; loreal about as high as long; two preoculars, of which the lower is a small subpreocular; two postoculars; temporals 2–3; upper labials 8, the fourth and fifth entering the eye; lower labials 10, five in contact with the anterior chin-shields, which are longer than the posterior; mental triangular, wider than long.

Dorsal scales with apical pits, faintly but sharply keeled, at least two lateral rows smooth, in 21–23–21–19 rows; ventrals 225; anal divided; subcaudals 79.

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[1] Named for Professor Henry Fairfield Osborn, President of The American Museum of Natural History, whose personal interest in the Museum's Asiatic Expeditions has greatly furthered their work.

General color fawn-brown; a dorsolateral black line on each side of the neck, reaching and passing the first black dorsal crossbar, and indicated on subsequent crossbars; a longitudinal row of narrow black spots below this; middle third of the body with somewhat irregular narrow dorsal black crossbars from ventral to ventral, mostly elongate between the 4th and 5th row to indicate a lateral line, which becomes, continuous on the posterior third of the body, between the 3rd and 4th scale rows; a row of dorsolateral spots on the 7th and 8th scale rows in this part of the body also tend to form a line, and continue as very distinct lines on the tail, which is otherwise uniform; most of the anterior and middle ventrals with black dots near their outer ends, and the ventrals opposite the black dorsal bars with large black marks on their tips; venter posteriorly uniform ; a few small black spots on parietals and labials.

This specimen measures 404 mm., of which the tail occupies .18.

A second specimen, A. M. N. H. No. 21072, from the same locality, agrees very closely with the above in coloration and essential scale characters; its dorsal scale formula is 21–19–17; ventrals 215; subcaudals 77.

This species is apparently identical with *Elaphe walli* (Werner), which is compared with the same species, *E. hodgsoni*, and differs from the above description chiefly in coloration. The differences may well be explained as age characters, Werner's specimen being much larger than ours. Though dated 1924, Werner's paper (1924*a*) was not received until some two months after the date of publication of my diagnosis[1] of *Elaphe osborni*, February 13, 1925. The question of priority thus raised must evidently be referred to a European authority for the exact date of Werner's paper.

Gonyosoma caldwelli,[2] new species

Figure 19

Type.—A. M. N. H. No. 21010; ♂; Yenping, Fukien; 1916; H. R. Caldwell.

Diagnosis.—Very closely allied to *Gonyosoma melli* (Vogt), from Kwangtung, and to *Gonyosoma frenata* Günther, of the Khasi Hills.

Head and body elongate, body compressed; ventrals sharply angulate; snout obliquely truncate, projecting; dorsal scales very faintly keeled, in 19 rows; ventrals 223; anal divided; subcaudals 108 (?+); supralabials 8, third, fourth, and fifth entering the eye; no loreal; one preocular; two postoculars; temporals 1–2; uniform green above and below, with a black stripe through the eye.

Description of Type.—Habitus of a tree snake, body and tail elongate, body compressed, ventrals strongly angulate; head slightly elongate, distinct from the neck, convex above in lateral profile; snout obliquely truncate, strongly projecting. Pupil round. Maxillary teeth 21 or 22, the last slightly enlarged.

Rostral just visible from above, broader than high; internasals broader than long, their suture half that of the prefrontals; frontal a little shorter than its distance from the rostral, as long as the parietal suture, five-sided, the lateral borders slightly concave; supraoculars as broad as the frontal; parietals truncate behind, drawn down at their latero-anterior corners to meet the lower postoculars; nasal elongate rhomb, longer than its distance from the eye; nostril large, in the middle of the nasal, with a groove extending to the upper border of the nasal; loreal absent; prefrontals in contact with the second labial; preocular large, not in contact with the frontal; upper labials 8, third, fourth, and fifth entering the eye; lower labials 10–11, five or six in contact with the anterior chin-shields, which are longer than the posterior; oculars 1–2; temporals 1–2; mental wider than long.

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[1] American Museum Novitates, No. 157, p. 4.

[2] Named for Mr. Harry R. Caldwell, who is largely responsible for the Expedition's Fukien collections.

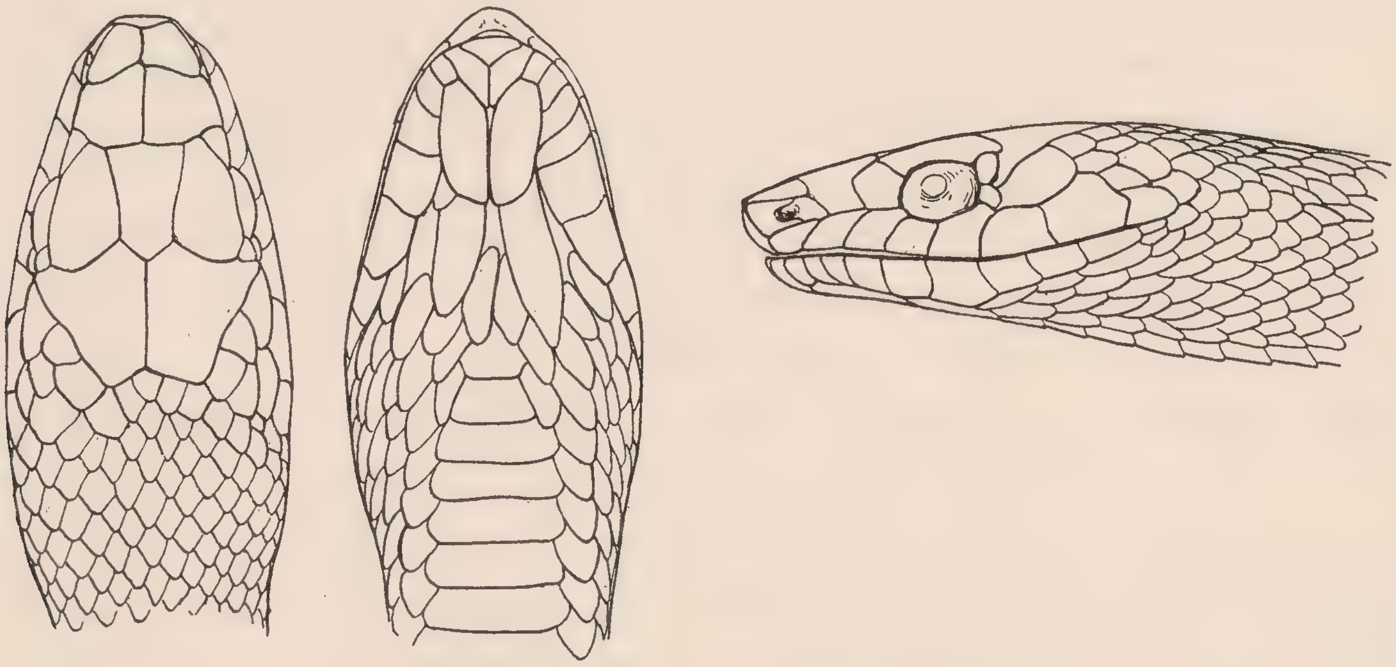

Fig. 19. *Gonyosoma caldwelli*, new species.
Dorsal, ventral, and lateral views of type, natural size.

Dorsal scales with rather faint apical pits, all except the outer row with very low and faint keels; scale rows 19–17–15; ventrals 223; anal divided; subcaudals 108.

Uniform bluish green above and below, doubtless green in life; a black postocular streak, apparently obscured by the preservation.

Length 1231 mm., tail length .26 of the total.

This species approaches *Rhadinophis melli* Vogt (Vogt, 1922, p. 140), from Kwangtung, rather closely. The latter has 212–216 ventrals, 144–148 subcaudals, and two anterior temporals, and thus appears to be amply distinct from *G. caldwelli*. The supposed generic characters of the dentition of *Rhadinophis* may easily be explained by the loss of alternate teeth, a very common phenomenon in the preparation of snake maxillæ for examination.

The *Coluber frenatus* from Col des Nuages, Ngoi-Tio, 4500–6500 feet altitude, Tonkin, Indo-China, recorded by Parker (1925, p. 305) is stated to have 205 ventrals and 145 subcaudals. It thus approaches *Gonyosoma melli* very closely.

Liopeltis major (Günther)

Four specimens, A. M. N. H. Nos. 21011, Yenping, Fukien, 1916, R. C. Andrews and Edmund Heller; 21034, 21035, Futsing, Fukien, July, 1916, R. C. Andrews and Edmund Heller; and 23531, bought at Wuhu, by Clifford H. Pope, 1921.

These specimens agree excellently with the Formosan series described by Stejneger. The minimum ventral count is reached in No. 21035 with 156. The uniform presence of only six lower labials is highly characteristic. Good series of this species from Fukien are much to be desired for comparison with the Formosan representatives.

The dorsal scale rows are uniformly fifteen throughout in three specimens, reducing to thirteen near the anus in one. Ventrals range from 156 to 168; subcaudals from 82 to 88; temporals 1–1 or 1–2. The largest specimen measures 836 mm. In the two male specimens the tail length is .27–.28 of the total, .24–.26 in the two females.

Holarchus chinensis (Günther)

Two specimens, A. M. N. H. Nos. 25571 Ningkwo, Anhwei, September–October, 1921, Clifford H. Pope , and 22706, Yunnanfu, Yunnan, John Graham, represent this species.

The Yunnan specimen agrees closely with the type in scale characters. The specimens recorded by Boulenger as coming from Hainan (cf. Schmidt, 1927, p. 398) agree closely with the Ningkwo specimen. It seems possible that there are two forms at present confused under this name. The Yunnan specimen differs from the Anhwei specimen in having narrower black crossbands intermediate between the principal series, and a light vertebral line. The scale characters and measurements are as follows:

A. M. N. H. No.	25571	22706
Sex	♂	♀
Dorsal Scales	17–15	17–15
Ventrals	170	192
Caudals	61	51
Upper Labials	7	9
Lower Labials	9	..
Preoculars	1	1
Postoculars	2	2
Temporals	1–2	1–2, 2–2
Dorsal Crossbands	12+4	13+3
Total Length	261 mm.	496 mm.
Tail/Total Length	.19	.15

Holarchus violaceus (Cantor)

Three specimens, A. M. N. H. Nos. 18618, Fukien Province, H. R. Caldwell, March 18, 1921; 21015, Yenping, Fukien, R. C. Andrews and Edmund Heller, summer, 1916; and 23536, bought at Wuhu, Anhwei, by Clifford H. Pope, 1921.

These specimens fall within the range of the Hainan series examined by me. There is no noteworthy difference in scaling or coloration.

Ahætulla boiga (Lacépède)

A. M. N. H. No. 21045, Lung Ling Ling, Yunnan, R. C. Andrews and Edmund Heller, March, 1917, represents this form.

The dorsal scales are 15–13–11; ventrals 192; tail incomplete; upper labials 9–10; lower labials 10; oculars 1–2; temporals 1–2–3 and 2–2–2.

Calamaria septentrionalis Boulenger

Eight specimens, A. M. N. H. Nos. 23535, 24533–24535, collected at Wuhu, Anhwei, and Nos. 24618–24620, 25572 at Ningkwo, Anhwei, September–October, 1921, by Clifford H. Pope.

This series shows the most complete uniformity. The dorsal scales are in 13 rows from head to tail; ventrals range from 160 to 161 in two males, from 170 to 184 in six females; subcaudals in the male specimens 18, in the females 9–11; upper labials 4; lower labials 5; oculars 1–1; temporals none; tail length .03 of the total in females, .07 in male specimens. The maximum length is 373 mm.

"A small 'two-headed snake' was discovered by a Chinaman while cutting grass on the side of a mound of earth beside an old garden path. When taken in the hand it went through violent spasmodic contortions for about five minutes, whereupon, apparently exhausted, it relaxed and turned over on its back.

"Another specimen, when put on the floor, was able to progress in regular snake-fashion. When held by the tail it continued to try to escape. When its head was held to the floor, the whole body was instantly thrown forward, wrapped around the restraining fingers, and the tip of the tail was repeatedly pressed against them. It seems that the tail takes the offensive while the head invariably tries to escape! The tail, in short, not only mimics the head in form and color pattern, but in behavior as well." (C. H. P.)

Enhydris plumbea (Boie)

This species is represented by A. M. N. H. Nos. 21013, Yenping, Fukien, R. C. Andrews and Edmund Heller, 1916, and 23537, bought at Wuhu, Anhwei, by Clifford H. Pope, 1921.

These specimens present no anomaly. The Fukien mountain range apparently represents the western limit of the range of this form in this part of China.

Enhydris chinensis (Gray)

Two specimens, A. M. N. H. Nos. 21075, without data, and 23494, Fukien Province, collected by H. R. Caldwell, 1921.

These specimens agree with the Hainan series. This species reaches the Yangtze Valley.

Boiga sinensis, new species

Figure 20

Type.—A. M. N. H. No. 23495; ♂; Fukien Province; 1921; H. R. Caldwell.

Diagnosis.—Closely allied to *Boiga kræpelini* Stejneger, from Formosa.

Head short and broad, the snout longer than the diameter of the eye; body compressed, tail long; ventrals not angulate; anterior palatine teeth slightly enlarged; posterior pair of chin-shields much smaller than the anterior; dorsal scales smooth, oblique, in 21 rows, the mid-dorsal row not enlarged; ventrals 230; anal divided; caudals 127; preoculars 3; postoculars 2–3; temporals very small, 4 to 6 in the first row, 6 to 7 in the second, not regularly arranged; ground color light reddish brown, with three series of darker brown spots.

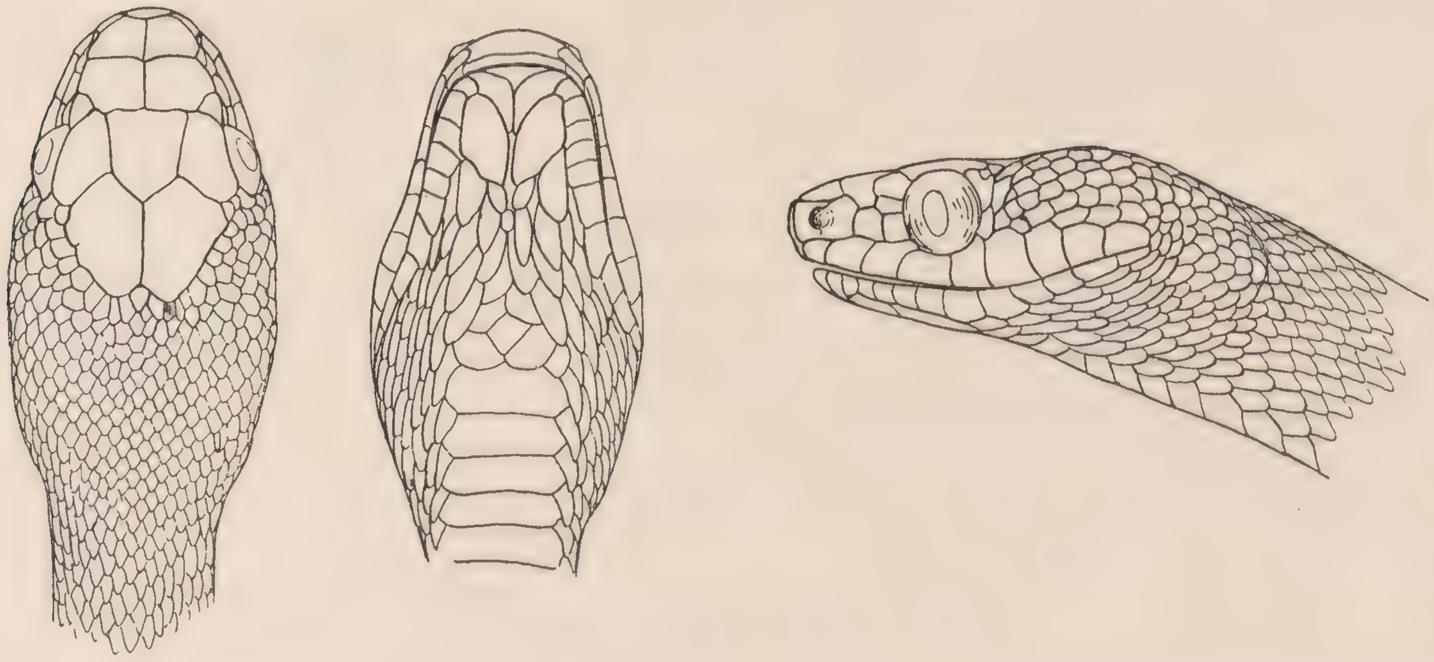

Fig. 20. *Boiga sinensis,* new species.
Dorsal, ventral, and lateral views of head of type, natural size.

Description of Type.—Body strongly compressed, head short and broad, very distinct from the neck; eye large, with vertically elliptic pupil; tail long and slender. Anterior palatine teeth slightly enlarged; maxillary teeth 12, subequal, with two enlarged, grooved fangs.

Rostral visible from above, narrowed above, wider than high; internasals wider than long, their suture two-thirds that of the prefrontals; prefrontals laterally on the side of the head to the loreal; frontal five-sided, as long as its anterior breadth, its sides nearly parallel, wider than the supraocular, shorter than its distance from the rostral, as long as the parietal suture; nasals large, divided, nostril large, anterior nasal on the front of the snout; loreal small, slightly higher than long; preoculars three, the upper not in contact with the frontal; postoculars 2–3; temporals replaced by very small undifferentiated scales, four to six in the first row; upper labials 9–10, the third, fourth and fifth entering the eye; lower labials 13, four in contact with the anteroir chin-shields; anterior chin-shields a little longer than and twice as wide as the posterior pair, which are widely separated; mental broader than long.

The dorsal scale rows range from twenty-five on the neck to twenty-one at midbody and fifteen near the tail; the dorsal scales are smooth, pointed, in oblique rows, the dorsal series not at all enlarged; I am unable to discover apical pits; ventrals 230; anal divided; subcaudals 127. The top of the head is light reddish brown, uniform, and the ground color of the back is simliar; a series of darker brown dorsal spots, 5–7 scales wide and 2–3 scales long, and an alternate series of smaller spots on each side, their scales black edged; posteriorly the lateral spots become indistinct; venter brown, with faint darker and lighter clouding; tail punctate beneath with dark brown.

The total length is 1201 mm., of which the tail occupies .25.

This species is very closely allied to *Boiga kræpelini* of Formosa, which has a much higher range of ventral and subcaudal counts, 236–250, and 140–154 (Steindachner, 1914, p. 343).

Both species have an ally in *Boiga forsteni* of India and Ceylon.

Bungarus multicinctus Blyth

This species is represented by A. M. N. H. Nos. 21027, Shaowu, Fukien, R. C. Andrews and Edmund Heller, 1916, and 23512, Yochow, Hunan, Clifford H. Pope, 1922.

These specimens present no noteworthy variation.

Naja naja atra (Cantor)

The common cobra of South China is represented by A. M. N. H. Nos. 21012, Yenping, and 21044, Futsing, Fukien Province, R. C. Andrews and Edmund Heller, 1916.

These specimens agree excellently with the series collected in Hainan by Clifford H. Pope.

Amblycephalus chinensis Barbour

Two specimens, A. M. N. H. Nos. 23505, collected at Luanshikau, 3000 feet altitude, Wanhsien, Szechwan, September, 1921, by Walter Granger, and 22703, Yunnanfu, Yunnan, John Graham, represent this rare form. These agree with Barbour's description and figure (1912, p. 132, Pl. II, fig. 1). Their scale characters and measurements are as follows:

A. M. N. H. Nos.	23503	22703	M. C. Z. 7326
Sex	♀	♀	♀
Dorsal Scales	15	15	15
Ventrals	177	169	180
Subcaudals	63	64	60
Upper Labials	7–8	7	7
Lower Labials	9–10	8–7	8–8
Preoculars	2	2	2
Postoculars		2	2–1
Temporals	2–2, 2–3	2–3	2–3
Total Length	496 mm.	502 mm.	..
Tail/Total Length	.19	.22	..

Crotalidæ

Agkistrodon strauchi Bedriaga

A single specimen, A. M. N. H. No. 21020, Snow Mountain, 9000 feet altitude, Likiang, Yunnan, R. C. Andrews and Edmund Heller, November, 1916, represents this species.

The dorsal scales are 21–19–17–15; ventrals 140; anal single; subcaudals 32; upper labials 6; lower labials 9; oculars 1–2; temporals 2–3 and 2–4; length 470 mm., tail 60 mm., .13 of the total. The color is brown with obscure black markings; a pair of black spots on the frontoparietal area.

The specimen contained 6+3 eggs, measuring about 12×15 mm., without embryos.

This specimen was identified as *A. tibetanus* Barbour, which must be united with *Agkistrodon strauchi* Bedriaga.

Agkistrodon halys brevicaudus (Stejneger)

Forty-eight specimens are referred to this form: A. M. N. H. Nos. 21475, 21496–21506, Hsing Lung Shan, Chihli, August, 1921, C. H. Pope; 24524–24526, 24536–24543, 24558, 25550–25570, Ningkwo, Anhwei, September–October, 1921, C. H. Pope; 23489, Shez, Wanhsien, Szechwan, 1921, Walter Granger; 23513, Yochow, Hunan, March, 1922, C. H. Pope; 28278, Chen Tzu, Taiyuan, Shansi, July–August, 1922, C. H. Pope.

The Ningkwo series contains two color phases, reddish brown and dark gray respectively, of which only the gray phase is matched in the Chihli series. The identity in scale characters of these three series is shown in the following tabulation.

The normal dorsal scale count is 23–21–19–17; 21–19–17 occurs twice in the Chihli series, twice in the Anhwei series, and in the Hunan

Variation in *Agkistrodon halys brevicaudus* and *intermedius*

		Ventrals			Caudals			Tail/Total Length mm.		
	Sex	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean
Agkistrodon h. brevicaudus (Chihli Series)	♂	3	138–142	140	3	39–44	41	3	.12–.15	.13
	♀	9	142–147	144	9	28–39	36	9	.10–.13	.12
Anhwei Series Gray Phase	♂	10	135–143	140	10	37–43	40	10	.12–.14	.13
	♀	7	138–147	141	7	31–37	35	7	.11–.13	.12
Anhwei Series Red Phase	♂	9	139–144	141	9	34–44	40	9	.11–.14	.13
	♀	3	139–147	144	3	34–38	36	3	.11–.13	.12
Agkistrodon h. intermedius										
Chili Series	♂	3	160–168	164	3	40–45	42	3	.12–.14	.13
Shansi Series	♂	3	165–175	170	3	48–51	49	3	.13–.15	.14
	♀	3	173–181	176	3	43–47	44	3	.10–.14	.12

and Szechwan specimens; 25–17 occurs once in the Chihli series, and 27–17 in the single Shansi specimen.

There are no noteworthy differences in head scaling or measurements.

The Shansi specimen, No. 28278, is of especial interest, as it is the only one whose ventral and caudal counts ally it to *intermedius*. It has 153 ventrals and 47 subcaudals. Its coloration agrees more closely with that of *intermedius* than with that of normal *brevicaudus*.

Agkistrodon halys intermedius Strauch

Six specimens, A. M. N. H. Nos. 23920, Mai Tai, Chao, Shansi, May, 1922, collected by Clifford H. Pope; and 28279, Tsagan Nor, Gobi Desert; 28280, 28281, 28347, Tze Tzen Wang, Mongolia, 28282, 260 miles s.e. of Sairusu on the Kalgan Trail, collected in the summer of 1922 by R. C. Andrews.

Three specimens, A. M. N. H. Nos. 21493–21495, collected by C. H. Pope, August, 1921, 13 miles north of Hsing Lung Shan, Chihli, plainly belong with *A. intermedius* rather than with *A. blomhoffii brevicaudus*, though they differ somewhat in scale formula from the Mongolian specimens.

The dorsal scale rows range from 23 to 28 anteriorly, from 21 to 25 at mid-body, and are uniformly 17 near the tail. The upper labials range from six to nine, the lower from nine to twelve. Preoculars and postoculars are uniformly two. Temporals 2–3 to 3–5. The length ranges from 422 to 568 mm., the tail length from .10 to .14 in the three female specimens, and from .13 to .15 in the three males. The ventrals in the male specimens range from 165 to 175, and from 173 to 181 in the females; the subcaudals in males are 48 to 51, in females 43 to 47.

The three Hsing Lung Shan specimens are juvenile males; their coloration agrees closely with that of the Mongolian series; the dorsal scale count and head scales are similar; but the ventrals, ranging from 160 to 168, and the subcaudals, 40 to 45, are distinctly fewer. Nevertheless, the range of ventrals in twelve *brevicaudus*, both male and female, from Hsing Lung Shan, is 138 to 147, so that these specimens are certainly much closer to *intermedius*.

Agkistrodon acutus (Günther)

A single male specimen, A. M. N. H. No. 24665, collected at Shengchorefu, Hunan, by H. H. Johnson.

This specimen agrees closely with Boulenger's description (1896, p. 524). It has 166 ventrals and 55 caudals, of which the first 13 are entire. It measures 1058 mm., of which the tail occupies .14.

Trimeresurus orientalis, new species

Type.—A. M. N. H. No. 21028; ♀; Shaowu, Min River, Fukien; 1916; R. C. Andrews and Edmund Heller.

Diagnosis.—Distinguished from its very near relative, the Himalayan *T. monticola*, by having ten upper labials instead of eight or nine; its second near ally, *T. okinavensis*, has seven or eight upper labials.

Description of Type.—Habitus stout; head short and broad, eye very small; body apparently somewhat compressed, with a slight vertebral ridge.

Upper head-shields flat, smooth, frequently broader than long, eight between the supraoculars; temporals smooth; a well-developed pair of internasals, separated by a single small scute; rostral wider than high; upper labials ten on each side, the second forming the anteroir border of the loreal pit, the fourth largest; three rows of scales between the eye and the upper labials; lower labials eleven, only two in contact with the anterior chin-shields; second pair of chin-shields scarcely distinguishable; two preoculars, two suboculars, and two postoculars.

Dorsal scales 27–25–21, the uppermost rows very faintly keeled, the rest perfectly smooth; ventrals 138; anal entire; subcaudals 37.

Ground color a light brown, consisting of a brown punctation on a still lighter yellowish brown; a series of subquadrate very dark brown markings on each side of the vertebral line, nearly always alternate and overlapping, and reaching the eighth scale row; a lateral row of small spots of the same color, often connected with the upper row; a lateroventral row of similar spots, often nearly confluent, on the lower scale rows and ends of the ventrals; ventrals light brown, punctate with darker brown, and each with two dark brown markings, which form irregular longitudinal bands; head black anteriorly and on the sides; the posterior part of the top of the head light brownish yellow, with obscure darker markings; posterior upper labials and several of the lower labials with light markings; some of the lateral gulars dark with light central spots on each scale; tail nearly black above with sharply defined small yellow spots, almost forming a longitudinal line.

Length 600 mm., tail 82 mm., .14 of the total.

Range.—Fukien and Formosa.

This is the form recorded from Formosa as *T. monticola.* Both Barbour (1909, p. 74) and Steindachner (1914, p. 37) record ten upper labials in their Formosan specimens. It has been recorded from Fukien (also as *monticola)* by Stanley (1914, p. 31). The head pattern of *monticola* figured by Günther (1864, Pl. xxiv, fig. *B)* is quite different from that of the present specimen; and Steindachner's description (*loc. cit.*), indicates agreement between our Fukien and his Formosan specimens in this respect.[1]

Trimeresurus mucrosquamatus (Cantor)

A. M. N. H. Nos. 23508, Yenchingkau, 1500 feet altitude, Wanhsien, Szechwan, Walter Granger, October, 1921, and 23523, Yenping, Fukien, H. R. Caldwell, 1921, represent this species.

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[1] Werner (1926), regards *orientalis* as a synonym of *monticola.* Where his material is more ample than mine I am disposed to follow his judgement. He has failed, however, to understand the relations of *gramineus* and its Chinese allies, which are discussed below.

The characters of these specimens are as follows:

A. M. N. H. Nos.	23508	23523
Sex	♀	♂
Dorsal Scales	27–23–19	29–25–19
Ventrals	206	203
Subcaudals	86	93
Upper Labials	9	10
Lower Labials	14	13–14
Oculars	3–1–2	3–1–2
Scales Between Internasals	3	3
Length	1000 mm.	864 mm.
Tail/Length	.19	.19

Trimeresurus gramineus (Shaw)

Figure 21

A single specimen of this species, as I propose to restrict it, was purchased at Wuhu, Anhwei, by C. H. Pope, 1921 (A. M. N. H. No. 23529). This specimen is therefor of uncertain origin, and it does not enter into the discussion of the partition of *gramineus* auct. It is remarkable as the only specimen of this group which is brown instead of green. It agrees in scale characters with the Hainan series. A typical Hainan specimen is figured for comparison with the following species.

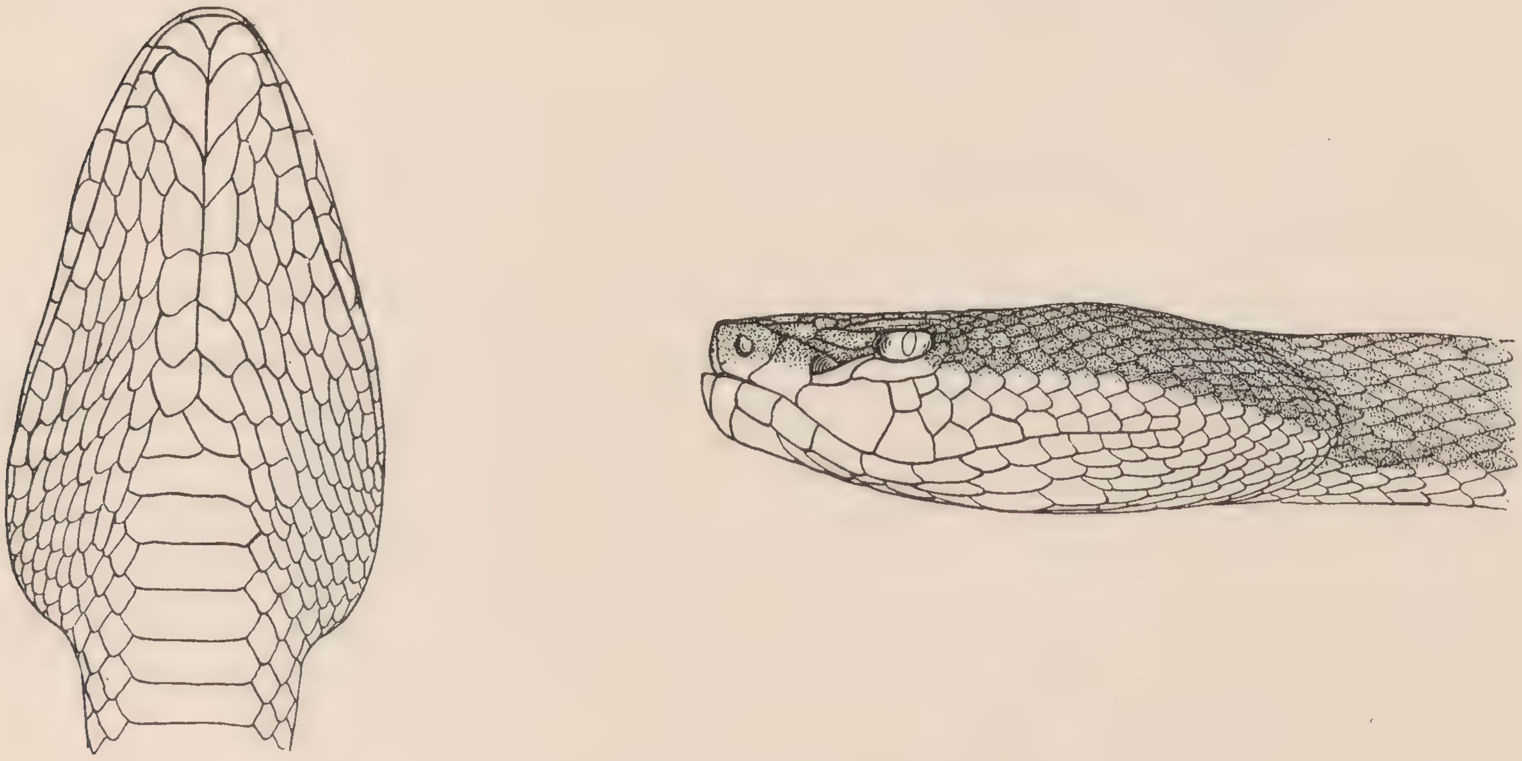

Fig. 21. *Trimeresurus gramineus* (Shaw).

Ventral and lateral views of head of A. M. N. H. No. 27935, Nodoa, Hainan. To show paired gulars behind chin-shields, fusion of nasal and first labial, and coloration.

Trimeresurus stejnegeri,[1] new species

Figure 22

Type.—A. M. N. H. No. 21054; ♂; Shaowu, Fukien; summer, 1916; R. C. Andrews and Edmund Heller.

Diagnosis.—Differs from the widespread *Trimeresurus gramineus*, with which it has hitherto been confounded, in the very small shields between the chin-shields and the first ventral plate, the smaller and more widely separated supranasals, the distinct first labial (which in South Chinese *gramineus* is frequently fused with the nasal), and the usual uniform green coloration of the side of the head.

Description of Type.—Habitus of *T. gramineus*.

Upper head shields smooth and flat; no especially enlarged internasals; seven scales bordering the nasals and rostral above; twelve scales between the supraoculars; rostral about as high as wide; upper labials 10–11, the first distinct from the nasal, the second bordering the loreal pit in front, and the third largest and in contact with the subocular; lower labials twelve, three in contact with the anterior chin-shields; only a single pair of chin-shields is regularly developed and these are followed by irregular gulars which extend to the first ventral; two preoculars, a strap-shaped subocular, and two or three postoculars; one supraocular is transversely divided.

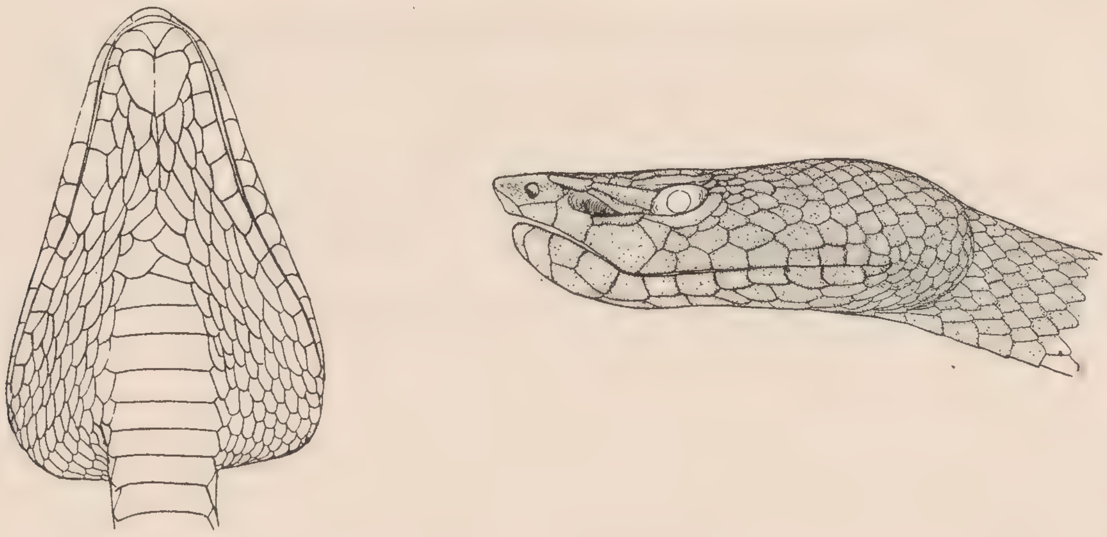

Fig. 22. *Trimeresurus stejnegeri*, new species.[2]
Ventral and lateral views of head of type, natural size.

General color dark bluish green (in alcohol), the venter lighter, each ventral with a narrow white posterior border; a narrow white lateroventral line extends along the middle of the first scale row, which is otherwise green; tip of tail brownish; no light markings on the side of the head.

Total length 688 mm., tail 111 mm., .16 of the total.

Notes on Paratypes.—Two additional specimens are associated with this species, A. M. N. H. Nos. 21053, Futsing, Fukien, and 23534 bought at Wuhu, Anhwei. The latter specimen, a female with 155 ventrals and 56 subcaudals, has a pair of slightly developed internasals, separated by a single scale; it has irregular gulars and a uniform green head like the type; the lateral stripe is broad, involving the edge of the second scale row. In the Futsing specimen the lateral stripe is confined to the scales of the first row, the upper halves of which are white and the lower gray. This specimen, also a female, has a well-developed pair of internasals, separated by a median scute; somewhat more regular gulars; and but for the uniform green side of the head it would offer some difficulty to distinguish it from *T. gramineus*. It has 164 ventrals and 63 subcaudals. In both paratypes the dorsal scales formula is 25–21–15.

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[1] Named for Dr. Leonhard Stejneger, Head Curator of Biology, United States National Museum, as a small tribute to his invaluable contributions to Oriental herpetology.

[2] The pupil is vertical, not round as indicated in the figure.

RANGE.—Mountains of Chekiang, Fukien, northern Kwangtung, and Formosa.

In establishing this form I have been guided by the fact that all of the Hainan specimens examined by me (Schmidt, 1925, p. 4), as well as all the available specimens from Indo-China, Siam, and India, have a strikingly distinct series of paired gulars extending from the chin-shields to the first ventral; the supranasals well-developed and usually in contact; and nearly always a light subocular line, below which the side of the head may be white or yellow. The type locality of *T. gramineus* is Vizigapatam, India, and the Indian specimens available for examination (A. M. N. H. No. 5166, "India," 2861, Punjab, and M. C. Z. No. 4490, "India," 4369, Amballa, and 5702, E. India), agree with the Hainan series. I therefore feel justified in restricting *gramineus* to this form, for which *T. albolabris* Gray is obviously a strict synonym.

The Formosan specimen described and figured by Stejneger (1907, p. 480, Figs. 370–372) agrees exactly with my diagnosis of *T. stejnegeri*. Two specimens in the Museum of Comparative Zoölogy (M. C. Z. No. 7389) from Bankoro, Central Formosa, also agree with the northern form. A specimen from Horisha, Formosa (A. M. N. H. No. 5076), combines the widely separated supranasals with somewhat more regular gulars, and has a distinct stripe on the side of the head. The series of nine Formosan specimens examined by Steindachner (1914, p. 39) are described as having small internasals, separated by one to three scales, and the side of the head usually unmarked. It is evident that intergradation between *gramineus* and *stejnegeri* may occur. Mell (1922, p. 126), who first suggested the division of Chinese *gramineus* into a northern and southern form, considers them as subspecies. He differentiated them on the basis of field observation in Kwangtung. Future collections from Fukien may be expected to define the status of *stejnegeri* and its relations with *gramineus* in a satisfactory way.

Two specimens from Moh Kan Shan, Chekiang (U. S. N. M. Nos. 64022, 64023), agree with the Fukien and Formosan specimens on both the supranasal and gular characters.

Trimeresurus yunnanensis, new species

TYPE.—A. M. N. H. No. 21058; ♂; Tengyueh, Yunnan; April–May, 1917; R. C. Andrews and Edmund Heller.

DIAGNOSIS.—Closely allied to *Trimeresurus stejnegeri* and distinguished from *T. gramineus* by the same characters. It is distinguished from the former species by having only nineteen rows of dorsal scales at mid-body, and twenty-one on the neck, compared with twenty-one at mid-body and 23–25 on the neck in *T. stejnegeri*. The average number of ventral plates, 155–160, is perhaps somewhat lower in *T. yunnanensis*.

Description of Type.—Habitus of *T. gramineus*,

Head-shields on top of head smooth and flat; no enlarged internasals; seven scales border the nasals and rostral above; rostral about as high as wide; upper labials 9–10, the first distinct from the nasal, the second forming the anterior border of the loreal pit, the third largest, and in contact with the subocular; eight scales between the supraoculars; three preoculars, a strap-shaped subocular, and two postoculars; lower labials 11–12, three in contact with the first pair of chin-shields; gulars not paired, irregular.

Dorsal scale-rows twenty-one on the neck, nineteen at mid-body, and fifteen near the tail; ventrals 156; subcaudals 67; dorsal scales all with low keels.

General color bluish green, in alcohol, the venter lighter, each ventral narrowly light-edged behind; a lateral strip on the first scale row, the upper half white, the lower half reddish brown; no markings on the side of the head.

Length 707 mm., tail 145 mm., .21 of the total.

Notes on Paratypes.—The three paratypes, A. M. N. H. Nos. 21055–21057, all from Tengyueh, agree with the type in the low number of dorsal scales, which drop to thirteen near the tail in one specimen, in the coloration of the side of the head, and in the gular character. They have more distinctly developed internasals, in each case separated by a median scute. One has a lateral line like that of the type, one has a narrow white line occupying only the middle of the first scale row, and the third has scarcely any distinguishable lateral line. The ventrals range from 155 to 160, and the subcaudals are 55 in the only one with a complete tail. I have examined two specimens at the Museum of Comparative Zoölogy, M. C. Z. No. 14671, from Yunnan Fu and No. 16734 from Luchien-hsien, Yunnan, which agree excellently with my diagnosis and can accordingly be named paratypes.

This form evidently requires comparison only with *T. stejnegeri*, with which it may prove to intergrade when the intermediate territory is explored.

BIBLIOGRAPHY

Barbour, Thomas. 1909. ‘Notes on Amphibia and Reptilia from Eastern Asia.’ Proc. New England Zoöl. Club, IV, pp. 53–78, Pls. vi–vii.

1910. ‘A note regarding the Chinese Alligator.’ Proc. Acad. Nat. Sci. Phila., pp. 464–467.

1912. ‘Some Chinese Vertebrates. Amphibia and Reptilia.’ Mem. Mus. Comp. Zoöl., XL, pp. 125–136, Pls. i–ii.

1922. ‘Further remarks on the Chinese Alligator.’ Proc. New England Zoöl. Club, VII, pp. 31–34.

1924. ‘A Yunnan Gecko.’ Occ. Papers. Boston Soc. Nat. Hist., V, pp. 133–135, fig.

Barbour, Thomas, and Dunn, Emmett Reid. 1919. ‘Two new Chinese Japaluras.’ Proc. New England Zoöl. Club, VII, pp. 15–19.

Bedriaga, J. von. 1907. ‘Wissenschaftliche Resultate der von N. M. Przewalski nach Central Asien unternommenen Reisen.’ Zoolog. Theil., Band III, Abt. 1, Amphibien und Reptilien, Lfg. 2. Lacertilia, pp. 73–278, Pls. ii–iv.

1909. Idem, Lfg. 3, pp. 279–502, Pls. v–vii.

1912. Idem, Lfg. 4, pp. i–iv, 503–769, Pls. viii–x.

Boulenger, George Albert, 1885. ‘Catalogue of the Lizards in the British Museum (Natural History).’ Second Edition. London, 8°, I, pp. xii+436, Pls. i–xxxii.

1887. Idem, III, pp. xii+575, Pls. i–xl.

1887*a*. ‘An account of the Reptiles and Batrachians obtained in Tenasserim by M. L. Fea of the Genoa Civic Museum.’ Am. Mus. Civ. Stor. Nat. Genova, (2) V, pp. 474–487, Pls. vi–viii.

1890. ‘Remarks on the Chinese Alligator.’ Proc. Zoöl. Soc. London, pp. 619–620, Pls. li–lii.

1893. ‘Catalogue of the Snakes in the British Museum (Natural History).’ London, 8°, I, pp. xiii+448, text figs. 1–26, Pls. i–xxviii.

1894. Idem, II, pp. xi+382, text figs. 1–25, Pls. i–xxv.

1896. Idem, III, pp. xiv+727, text figs. 1–37, Pls. i–xxv.

1899. ‘On a collection of Reptiles and Batrachians made by Mr. J. D. Latouche in N. W. Fokien, China.’ Proc. Zoöl. Soc. London, pp. 159–172, Pls. xvi–xix.

1903. ‘Descriptions of new Lizards in the British Museum.’ Ann. Mag. Nat. Hist., (7) XII, pp. 429–435.

1904. ‘Descriptions of new Frogs and Snakes from Yunnan.’ Idem, (7) XIII, pp. 130–134.

1906. ‘Descriptions of new Reptiles from Yunnan.’ Idem, (7) XVII, pp. 567–568.

1908. ‘Description of a new Snake from Yunnan.’ Idem, (8) II, p. 244.

1909. ‘On the Ophidian Genus *Grayia*.’ Proc. Zoöl. Soc. London, pp. 944–952, text figs. 295–299.

1914. ‘Description of a new Snake of the genus *Coluber* from Northern China.’ Ann. Mag. Nat. Hist., (8) XIII, p. 576.

1916. ‘Description of a new Snake of the genus *Coluber* from Northern China.’ Idem, (8) XVII, p. 243.

1918. 'Description of a new Lizard of the genus *Acanthosaura* from Yunnan.' Idem, (9) II, p. 162.

1921. 'Monograph of the Lacertidæ.' London, 8°, II, pp. viii+451

GÜNTHER, ALBERT C. L. G. 1864. 'The Reptiles of British India.' London, 4°, pp. xxvii+452, 7 text figs., Pls. I–XXVI.

1892. 'List of the species of Reptiles and Fishes collected by Mr. A. E. Pratt on the Upper Yang-Tze-Kiang and in the Province of Szechwan, with description of New Species.' In Pratt, A. E., 'To the Snows of Tibert Through China.' London, 8°, p. 000.

1896. 'A report on the collections of Reptiles, Batrachians, and Fishes made by Messrs. Potanin and Berezowski in the Chinese Provinces of Kansu and Szechwan.' Ann. Mus. Zoöl. Acad. Sci. St. Petersburgh, I, pp. 199–219, Pls. I–II.

JACOT, ARTHUR, 1923. 'Shantung Herpetology.' China Journ. Sci. Arts., I, pp. 257–260.

MELL. R. 1922. ''Beitrage zur Fauna sinica I Die Vertebraten Sudchinas; Feldlisten und Feldnoten der Säuger, Vogel, Reptilien, Batrachier.' Arch. Naturg., LXXXVIII, Abt. A, Heft 10, pp. 1–146, text fig., map, and Pls. I–IV.

PARKER, H. W. 1925. 'Variation of the lepidosis of a snake from S. E. Asia.' Ann. Mag. Nat. Hist., (9) XV, pp. 296–298, diagram.

1925*a*. 'A collection of Reptiles and Batrachians from Tonkin.' Idem pp. 300–306.

SCHMIDT, KARL PATTERSON. 1925. 'New Reptiles and a new Salamander from China.' Amer. Mus. Novitates, No. 157, pp. 1–5.

1925*a*. 'New Chinese Amphibians and Reptiles.' Idem, No. 175, pp. 1-3.

1927. 'The Reptiles of Hainan.' Bull. Amer. Mus. Nat. Hist., LIV, pp. 395-465, Pl. XXVII, Text Figs. 1-17.

STANLEY, ARTHUR. 1914. 'The collection of Chinese Reptiles in the Shanghai Museum.' Journ. N. China Branch Roy. Asiatic Soc., XLV, pp. 21–31.

STEINDACHNER, FRANZ. 1914. 'Bericht uber die von Hans Sauter auf Formosa gesammelten Schlangenarten.' Denkschr. Akad. Wiss. Wien (math.-natur), XC, pp. 319–361, text figs. 1–21, Pls. I–IV.

STEJNEGER, LEONHARD. 1907. 'The Herpetology of Japan.' Bull. U. S. Nation. Mus., No. 58, pp. xx+577, text figs. 1–409, Pls. I–XXXV.

1924. 'Herpetological Novelties from China.' Occ. Papers Boston Soc. Nat. Hist., V, pp. 119–121.

1925. 'Description of a new Scincid Lizard and a new Burrowing Frog from China.' Journ. Wash. Acad. Sci., XV, pp. 150–152.

1925*a*. 'Chinese amphibians and reptiles in the United States National Museum.' Proc. U. S. Nation. Mus., LXVI, Art. 25, pp. 1–115.

VOGT, THEODOR. 1922. 'Zur Reptilien und Amphibien-Fauna Südchinas.' Arch. Naturg., LXXXVIII, Abt. A, Heft 10, pp. 135–146.

1924. 'Reptilien und Amphibien aus Szechwan. Osttibet, und Tschili.' Zool. Anz., LX, pp. 337–344.

WALL, FRANK. 1903. 'A Prodromus of Snakes hitherto recorded from China, Japan, and the Loo Choo Islands; with some notes.' Proc. Zoöl. Soc. London, pp. 84–102.

1911. 'A popular treatise on the common Indian Snakes.' Part XIV. Journ. Bombay Nat. Hist. Soc., XX, pp. 603–633, Pl. XIV, text figs., and map.

1911*a*. Idem, Part XV, pp. 933–953, Pl. XV, Pl. A, diagrams, and maps.

1923. 'Notes on a collection of Snakes from Sinlum Kaba.' Idem, XXIX pp. 466–468.

WERNER, FRANZ. 1904. 'Über Reptilien und Batrachier aus Guatemala und China in der Zoologischen Staats- Sammlung in München, nebst einem Anhang über seltene Formen aus anderen Gebieten.' Abh. Bayer. Akad. Wiss., II Kl., XXII, pp. 343–384, text figs. Pl.

1909. 'Über neue oder seltene Reptilien des Naturhistorischen Museums in Hamburg.' I. Schlangen. Mitt. Naturh. Mus. Hamburg, XXVI, pp. 205–247.

1910. Idem (II. Eidechsen.), XXVII, pp. 1–46.

1922. 'Neue Reptilien aus Süd-China gesammelt von Dr. Handel-Mazetti.' Anz. Akad. Wiss. Wien, LIX, pp. 220–222.

1924. 'Ergebnisse der Expedition Dr. Handel-Mazetti's nach China 1914 bis 1918 auf Kosten der Akademie der Wissenschaften in Wien Über Reptilien und Amphibien aus Südchina.' Denkschr. Akad. Wiss. Wien (math.-natur.), XCIX, pp. 39–58.

1924*a*. 'Neue oder wenig bekannte Schlangen aus dem Naturhistorischen Staatsmuseum in Wien.' Sitzber. Akad. Wiss. Wien (math.-natur.), Abt. I, CXXXIII, pp. 29–56, figs. 1–9.

1926. 'Synonymisches über Schlangen von Hainan und vom chinesischen Festland.' Zool. Anz., LXVII, pp. 141-144.

Plate XXVIII

Fig. 1. Dorsal, ventral, and lateral view of the head of *Coluber spinalis* Peters, A. M. N. H. No. 28257, × 4.

Fig. 2. Dorsal, ventral, and lateral views of head of *Elaphe dione* (Pallas), A. M. N. H. No. 28258, × 2.

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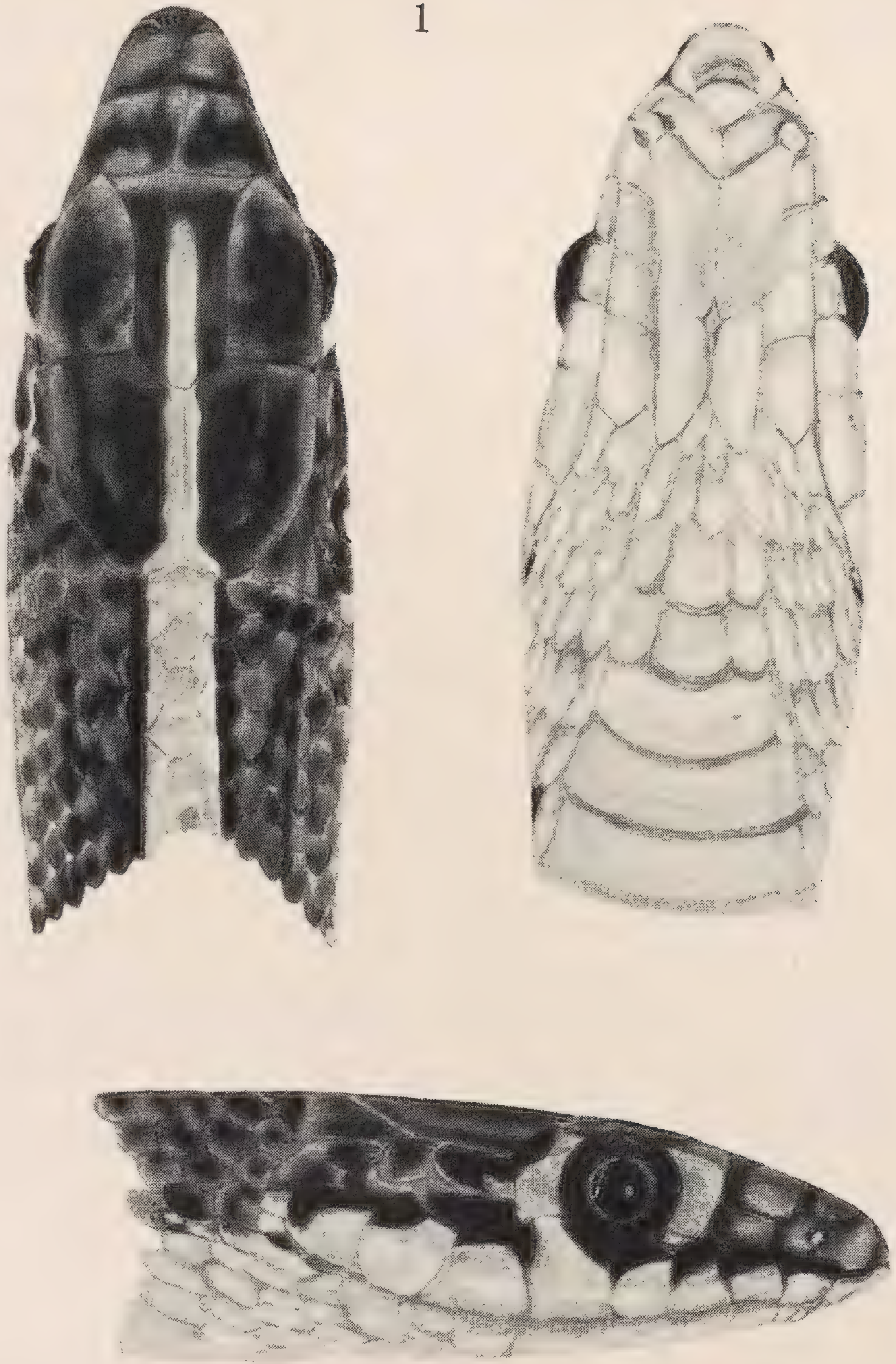

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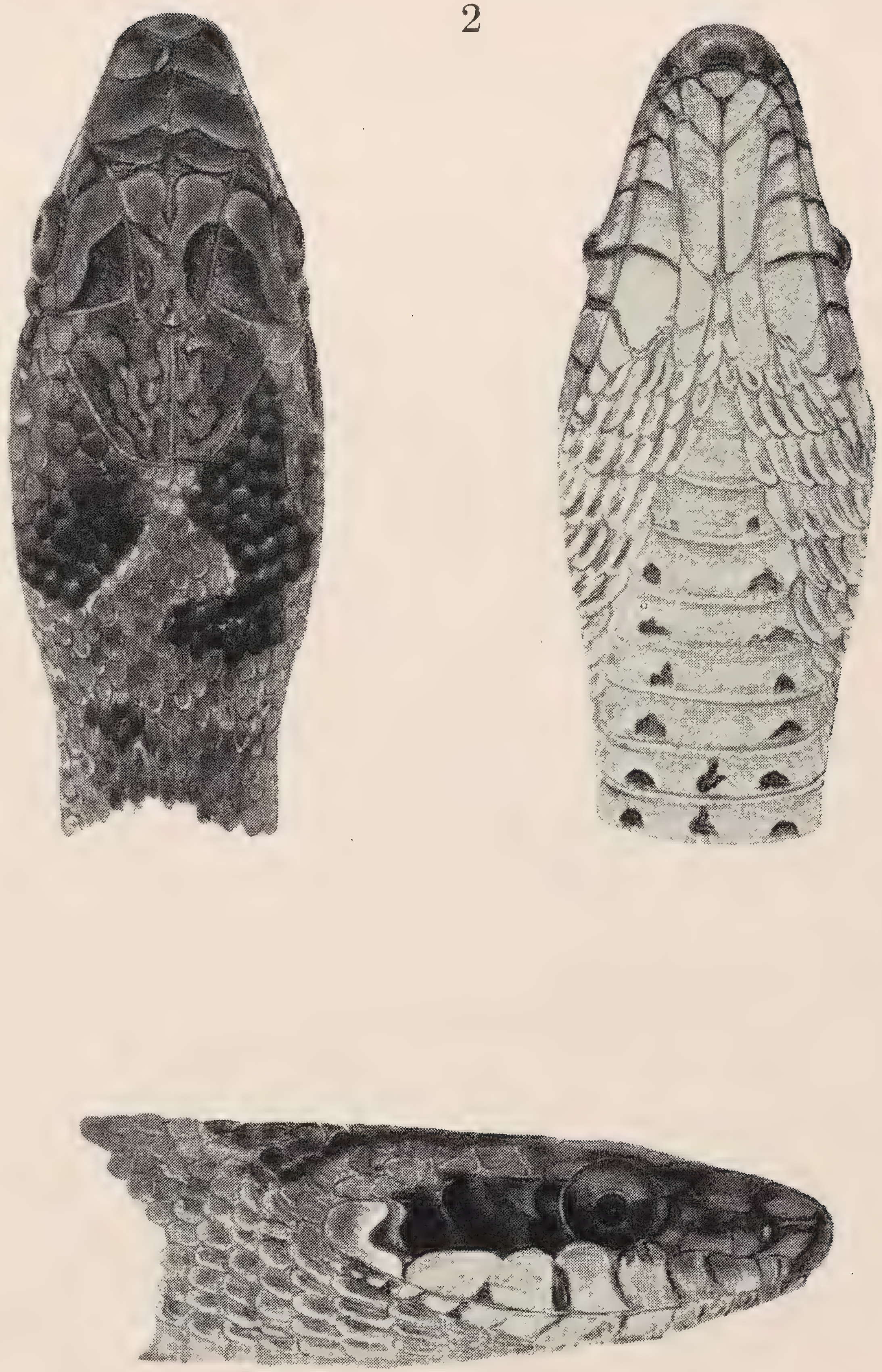
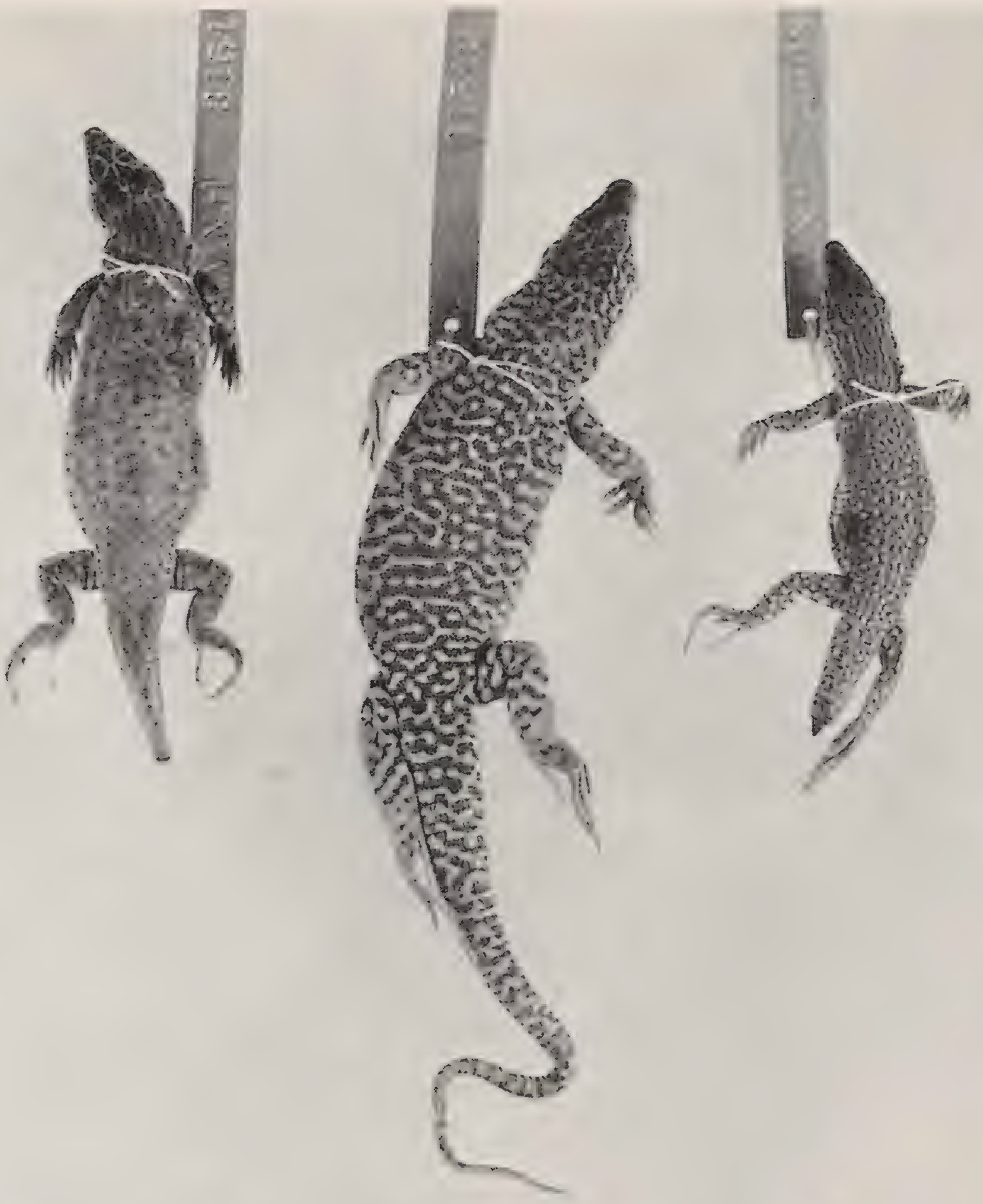


PLATE XXIX

Fig. 1. *Eremias przewalskii* Stranch, A. M. N. H. Nos. 31510, ♀, 31512, ♂, and 31508, juv. To show pattern variation with age and sex.

Fig. 2. *Japalura splendida* Barbour and Dunn, A. M. N. H. No. 23552, ♀, 23553 and 23558, ♂. To show pattern variation with sex.



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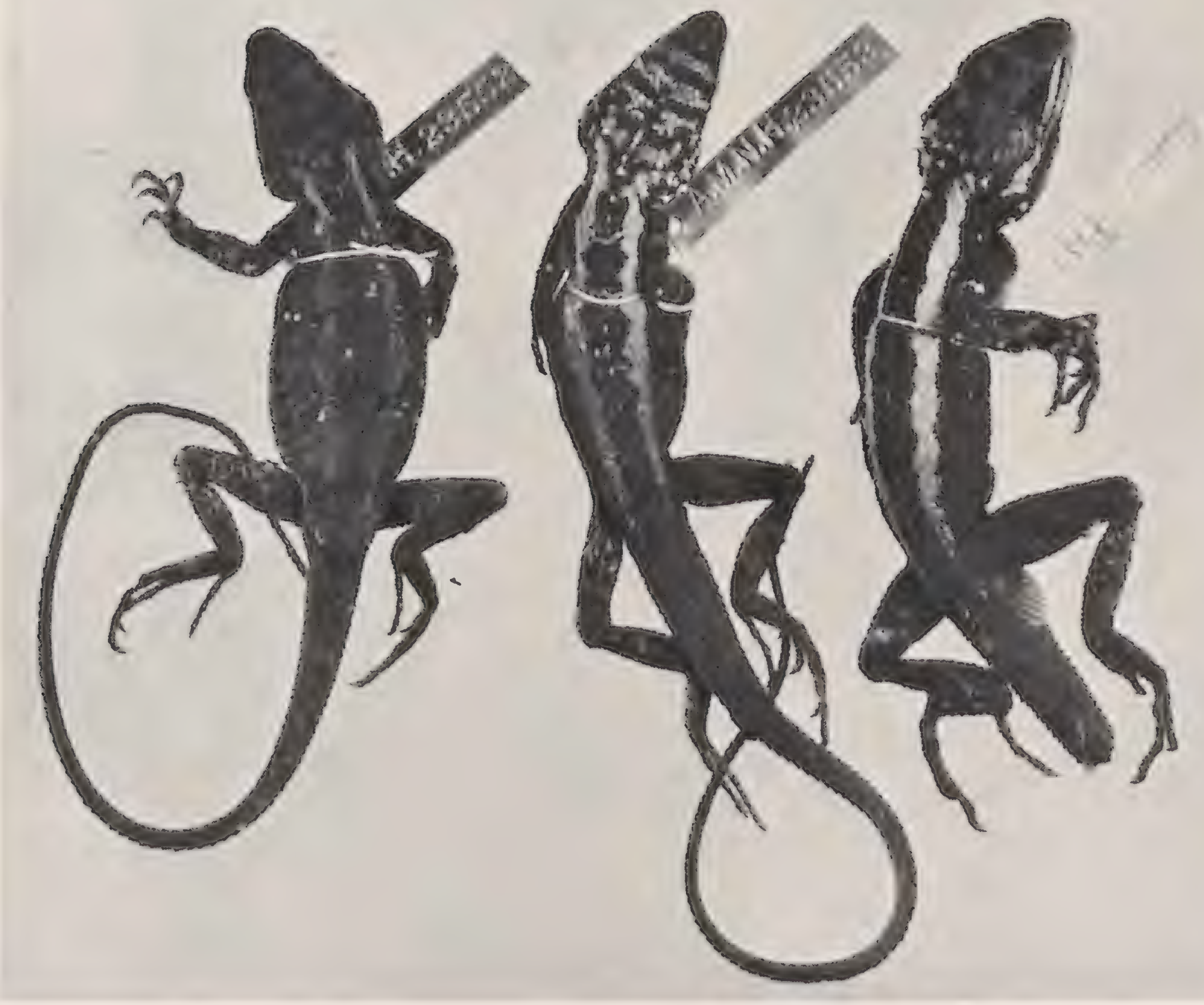

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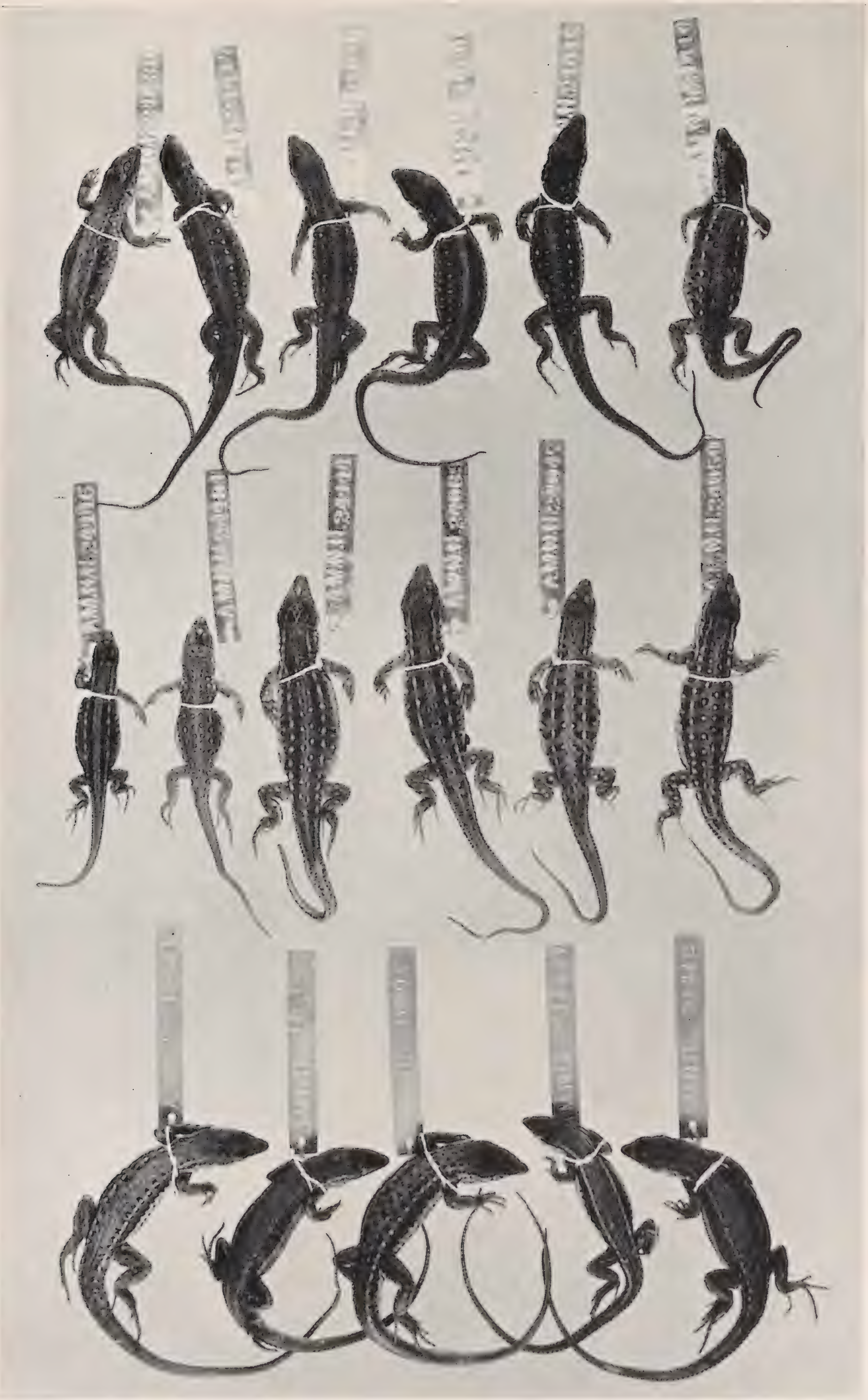
Plate XXX

Fig. 1. *Eremias argus* Peters, A. M. N. H. Nos. 21430, 21417, 21418, 21420, 21412, 21414. Pattern variation.

Fig. 2. *Eremias barbouri*, new species, A. M. N. H. Nos. 24115, 24101, 24111, 24089, 24047, 24050. Pattern variation.

Fig. 3. *Eremias brenchleyi* Gunther, A. M. N. H. Nos. 31409, 31413, 31404, 31408. 31412. Pattern variation.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Article V.—NOTES ON CHINESE AMPHIBIANS[1]

By Karl Patterson Schmidt[2]

Plates XXXI and XXXII

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INTRODUCTION

The Chinese amphibians in The American Museum of Natural History, from all sources, number 1860 specimens, exclusive of the Hainan collection. Of these, 1389 were collected by the Third Asiatic Expedition; 173 were collected in Fukien by H. R. Caldwell; 82 were presented by Mr. J. W. Williams, of the College of Yale-in-China, Changsha, Hunan; 76 were collected by Mr. R. C. Andrews and Edmund Heller in Fukien and Yunnan, 1916–1917; 74 were purchased from the Rev. John Graham of Yunnanfu, Yunnan; 50 were purchased from Mr. Arthur Jacot, of Shantung Christian University, Tsinan, Shantung; 9 come from the Kreyenberg collection; 5 were presented by Mr. Makoto Nishimúra; and two are from Mr. H. H. Johnson. Three specimens of a salamander of the genus *Batrachuperus*, presented to the Field Museum of Natural History by Mr. Robert B. Ekvall, Titao, Kansu, add a species to the list considered.

These specimens are distributed among the following families and genera:

	No. Genera	No. Species	No. Specimens
Salamanders			
Salamandridæ	3	4	74
Hynobiidæ	1	1	3
Frogs and Toads			
Discoglossidæ	1	2	22
Bufonidæ	1	5	373
Hylidæ	1	2	100
Brevicipitidæ	2	3	225
Ranidæ	2	22	1066

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[1] Publications of the Asiatic Expeditions of The American Museum of Natural History. Contribution No. 77.

[2] Of the Field Museum of Natural History.

The new forms are five in number.[1]

SPECIES	TYPE LOCALITY
Batrachuperus tibetanus	Tibetan Border of Kansu.
Bufo andrewsi	Likiang, Yunnan.
Rana nigromaculata mongolia	Mai Tai Chao, Shansi.
Rana noblei	Yunnanfu, Yunnan.
Rana caldwelli	Yenping, Fukien.

As in the case of previous papers on the collections of the Third Asiatic Expedition, I am indebted to Dr. Leonhard Stejneger of the United States National Museum and to Dr. Thomas Barbour, of the Museum of Comparative Zoölogy, for permission to examine specimens in their charge and for cordial aid and advice.

My connection with the present report results from a cordial coöperative agreement between the Field Museum of Natural History and The American Museum of Natural History, arranged at the instance of Mr. Roy Chapman Andrews, leader of the Third Asiatic Expedition.

ANNOTATED LIST OF SPECIES

CAUDATA

Hynobiidæ

Batrachuperus tibetanus, new species

TYPE.—A. M. N. H. No. 5900; adult female; Tibetan border of Kansu, at about latitude 33° N., elevation 9000 feet; December, 1923; Robert B. Ekvall.

DIAGNOSIS.—Closely allied to *Batrachuperus pinchonii*, from which it may be distinguished by the more posteriorly situated vomerine teeth; the more depressed head; the fourteen costal grooves; the absence of horny covering on the palms and soles, only the tips of the digits having a horny epidermis; the somewhat longer tail, .49–.52 of the total length; and the much lighter coloration.

DESCRIPTION OF TYPE.—Costal grooves, 14; the appressed toes overlap; head width 6 times, and head length 4½ times in length from snout to vent; eye as long as its distance from tip of snout; a prominent labial fold on the upper jaw; a slight fold on the lower jaw; a shallow groove back of the eye; a well-marked groove from eye to gular fold; no groove to angle of jaw; gular fold extends on sides of neck to dorsal surface; limbs well developed, overlapping when appressed; fingers 2–3–4–1 and toes 3–2–4–1 in order of length; tips of digits covered with a thick horny epidermis, which is absent from the palms and soles; tail cylindrical at the base, flattened gradually to the tip, only the last one-fourth very flat; vent formed by the confluence of five grooves; much swollen; vomerine teeth 5–5, in slightly arched series beginning well within and slightly behind the internal nares and extending diagonally forward to the level of their anterior border; distance between the vomerine series about equal to the length of one of them; olive-gray above with indistinct black marbling.

MEASUREMENTS.—Body 85 mm.; tail 80 mm.; length head 18 mm.; breadth head 14 mm.; arm 23 mm.; leg 27 mm.

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[1] Diagnoses of these forms have appeared in Amer. Mus. Novitates, No. 157, February 13, 1925, and No. 175, May 28, 1925.

Paratypes.—Two additional female specimens with the same data as the type agree with it in all essential characters.

Range.—Western Szechwan and Kansu, and borders of Tibet.

In recording a specimen of this genus from western Szechwan as *Batrachuperus sinensis* (Sauvage), (=*B. pinchonii* (David), cf. Stejneger 1925*a*, p. 5) in his valuable revision of the Hynobiidæ, Dunn describes in detail its differences from typical specimens of Mt. Omei *sinensis*. These had already been noted by Barbour in recording the same specimen for the first time (1912). While the locality is somewhat remote from that of the new specimens at hand, it seems very likely that this specimen, a male, belongs with the proposed *tibetanus*.

Salamandridæ

Tylototriton verrucosus Anderson

Two specimens, A. M. N. H. Nos. 5384–5385, were collected at Tengyueh, Yunnan, May 14, 1917, and one at Genkang, Yunnan, February 5, 1917, by R. C. Andrews and Edmund Heller.

Triturus orientalis (David)

A. M. N. H. Nos. 18549 and 21501–21506, collected at Ningkwo, Anhwei, September 28, 1921, by Clifford H. Pope.

One specimen, No. 18549, has a very smooth skin, in strong contrast with the remaining six specimens, and has a somewhat wider tail-fin. It thus strongly suggests an aquatic stage, while the more rugose specimens probably represent a terrestrial stage.

Measurements of two specimens.

A. M. N. H. Nos.	18549	21504, ♀
Total Length	72 mm.	54 mm.
Head Length	10	7
Arm	14	9
Leg	15	10

Triturus wolterstorffii Boulenger

A. M. N. H. Nos. 6560–6562, Yunnanfu, Yunnan, 1919, collected by John Graham.

Pachytriton brevipes (Sauvage)

Sixty-one specimens, collected in Fukien by H. R. Caldwell, as follows: A. M. N. H. Nos. 8097, 8099, 8123–29, 8131–32, 8134–35, 8143, Mountains near Yenping, August, 1920; and 18502–18548, Fukien Province, 1921–1922.

The ventral coloration in this series is highly variable. There is a tendency toward a mid-ventral longitudinal line. Juvenile specimens have much more sharply defined ventral markings.

Measurements of three specimens follow.

A. M. N. H. No.	18529	8126	18508
Sex	♂	♀	juv.
Total Length	173 mm.	168 mm.	88 mm.
Body	82	85	43
Head	21	21	12
Tail	19	83	45
Arm	18	17	11
Leg	21	21	13

The reference to this species by Werner (1924, p. 49) is evidently a *lapsus* for *Batrachuperus pinchonii* (David). His synonymy refers to the latter species.

SALIENTIA

Discoglossidæ

Bombina orientalis (Boulenger)

Five specimens of this species were presented to the American Museum by Mr. Makoto Nishimura: A. M. N. H. Nos. 5168–5169, Sokako in Amposen, Manchuria, and 5180–5182, Mukden, Manchuria.

Bombina maxima (Boulenger)

Seventeen specimens of this form are in the American Museum collection. A. M. N. H. Nos. 5445, 5447, Yunnanfu, 6550–6552, Hsinshao, and 8144, Wutingchow District, were collected by John Graham in Yunnan. A. M. N. H. Nos. 5749–5759 were taken at Likiang, 8500 feet altitude, Yunnan, October 4, 1916, by R. C. Andrews and Edmund Heller.

Males of this species are apparently without vocal sacs and without asperities on the toes. The first, second, and third fingers, the metacarpal tubercle, and the inner face of the forearm are provided with horny nuptial asperities. The metacarpal tubercle is much enlarged in the males and scarcely evident in the females. In one specimen the asperities are wanting on the third finger of one side.

Bufonidæ

Bufo melanostictus Schneider

A. M. N. H. Nos. 674 comes from Pinghsiang, Kiangs; 18444, Yenping, Fukien, and 18467–18570, 18559–18565, Fukien Province, collected by H. R. Caldwell; and 5386–5407, 6313, Tengyueh, Yunnain, May, 1917, R. C. Andrews and Edmund Heller.

The Yunnan specimens differ somewhat from the Fukien series in having a more thickened supraorbital crest, which is decidedly crenulate in two specimens.

Bufo bankorensis Barbour

Eighty-one specimens are referred to this species as follows: A. M. N. H. Nos. 11306, 11308, 11309, 11311, Base of Tei Pei Shan, Tsing Ling Mts., Shensi, October, 1921; 13158, 13162, 13164–13165, Chikungshan, Honan, August 26, 1918, J. W. Williams; 13153–13154, 13163, 13169–13170, 13172–13175, 13177–13178, 13180–13181, 13188–13190, Changsha, Hunan, 1919, J. W. Williams and K. F. Yan; 18649–18650, Shengchorefu, Hunan, H. H. Johnson; 18440, 21928–21954, Ningkwo, Anhwei, September–October, 1921, and 21507–21533, Wuhu, Anhwei, September-October, 1921, collected by Clifford H. Pope; 18597, Yenchingkau, Szechwan, October, 1921, and 18441–18443, Luanshikau, Szechwan, September, 1921, collected by Walter Granger.

I am fully convinced that if *Bufo gargarizans* of Chusan Island and *Bufo asiaticus* of Shanghai are both placed as subspecies of *Bufo bufo*, they must be considered synonymous. The question of the identity of the present form however, is far from clear, as it strongly approaches *Bufo bankorensis* Barbour, described from Formosa. The larger specimens in the present series all have a perfectly smooth head, while juvenile specimens, and occasional half-grown specimens, are scarcely distinguishable from the northern form of *Bufo bufo* on this character.

The ventral coloration in this series is not evidently correlated with any other character. In the Anhwei series, of twenty-one juvenile specimens, one has very small, but distinct black dots; nine have well-defined black markings; and eleven are immaculate or with very indistinct or very few spots. In sixteen males, seven have rather distinct black markings; six have indistinct or very few spots, mostly posterior if present; and three are unspotted. In seventeen females, seven have well-defined black markings, and ten are nearly free from ventral spots. When the most strongly marked of these specimens are directly compared with the Shansi series, it is found that those from Anhwei are much less extensively and less intensely black than the northern species.

General smoothness of body appears as an occasional variation, and does not appear to be correlated with variation in coloration or in measurements.

The head of *Bufo bufo japonicus* appears to be more rounded when viewed from beneath, with a larger mouth. I have measured the distance between the rictal angles and the vertical distance between the latter line and the front of the mouth to show this character. The ratio between the two characters appears as mouth proportion in the tabulation.

Summary of Measurements

	Sex	No. Specimens	Extremes	Average
Body Length	♂	10	75–115 mm.	86 mm.
	♀	10	85–114	99
Leg/Body	♂	10	1.17–1.47	1.35
	♀	10	1.11–1.31	1.20
Width Head/Body	♂	10	.35–.39	.37
	♀	10	.35–.40	.38
Length Foot/Leg	♂	10	.31–.36	.35
	♀	10	.32–.37	.33
Mouth Proportion	♂	10	.41–.52	.45
	♀	10	.41–.47	.44

A singular problem is presented by the distribution of the common toads of central China. It seems evident that the common species at Shanghai and in the provinces of Chekiang is a subspecies of *Bufo bufo*, while at Ningkwo and Wuhu, in Anhwei, the sole and very abundant species is *Bufo bankorensis*. A specimen of *bankorensis* in the Field Museum of Natural History received from Dr. C. Ping, Nanking, and the record of *Bufo bufo asiaticus* from the same locality and source by Stejneger (1925*a*, p. 7) indicate that both species occur in the vicinity of Nanking, and the two species are recorded from several localities in Szechwan.

Twenty stomachs contained food: twelve contained beetles or beetle fragments; five contained unidentified insect remains; four, ants; three, grasshoppers; three, millipedes; two, snails; two, plant remains; one (each), remains of a small toad, earwig fragments, spiders, and centipede fragments.

Bufo bufo japonicus (Schlegel)

Thirty-two specimens are referred to this form: A. M. N. H. Nos. 11307, 11310, 18439, Peking, Chihli, October-November, 1921; 14551–14569, 14682, Hsing Lung Shan, Chihli, August, 1921; and 17882–17890, Kwei Hwa Cheng, Shansi, June 1–10, 1922, all collected by Clifford H. Pope.

The differences between this series and the common toad of central China have been noted above. I have referred them to *japonicus* because of the strongly maculate venter, the chief character emphasized by Stejneger for this form.

SUMMARY OF MEASUREMENTS

	Sex	No. Specimens	Extremes	Average
Body Length	♂	7	80–103 mm.	88 mm.
	♀	5	71– 99	84
Leg/Body	♂	7	1.32– 1.46	1.38
	♀	5	1.13– 1.42	1.26
Width Head/Body	♂	7	.35– .40	.37
	♀	5	.38– .42	.39
Foot/Leg	♂	7	.30– .40	.36
	♀	5	.29– .34	.33
Mouth Proportion	♂	7	.52– .64	.59
	♀	5	.50– .61	.55

Bufo andrewsi, new species

Plate XXXII, Figure 3

TYPE.—A. M. N. H. No. 5769; Likiang, 8500 feet altitude, Yunnan; October 4, 1916; R. C. Andrews and Edmund Heller.

DIAGNOSIS.—Closely allied to *Bufo bufo* from which it is distinguished by the presence of a tarsal fold, its finer and more uniform tuberculation, the less divergent parotids, and the tuberculate top of the head.

DESCRIPTION OF TYPE.—Head moderately wide, flat above; nostrils about equidistant from the point of the snout and the eyes, the distance between them about equal to their distance from the labial border and from the upper eyelid; tympanum distinct, vertically oval, its greatest diameter about equal to its distance from the eye; parotid glands large, slightly less than twice as wide, nearly parallel; arms rather long; first and second fingers equal; two large palmar tubercles, the smaller with nuptial asperities, which are also present on the upper surfaces of the first and second fingers and on the inner side of the third; subarticular tubercles of fingers not divided; heels barely meeting when the legs are placed at right angles to the body; toes webbed, the web extending as far as the end of the two basal phalanges of the third and of the first phalanx of the fourth toes; web extending as a narrow border to the tips of the toes, outer side of fifth toe with a similar "fin"; inner metatarsal tubercle rounded, about as long as wide, brown, one-half the length of the first toe; outer tubercle small; subarticular tubercles beneath the third and fourth toes divided; a well-defined tarsal fold, not reaching the heel; plantar and palmar tubercles smooth, without asperities. Upper surface covered with small spinose warts, some of which are confluent into elongate crests which form a well defined lateral row and a less distinct Λ–shaped group between the posterior ends of the parotids; a group of enlarged tubercles behind the rictus; top of head tuberculate; the tubercules, except when multi spinose, all smaller than the tympanum; belly covered with rather uniformly set low tubercles, each faintly horny at its tip.

Nearly uniform dark brown above, with faintly suggested darker longitudinal bands; lower half of the parotid black; belly a little lighter brown, with distinct rather small black spots, uniformly distributed; similar spots on the lower surfaces of the limbs.

MEASUREMENTS

A. M. N. H. Nos.	5769, Type	5767	5773
Sex	♂	♀	juv.
Snout to Anus	71 mm.	82 mm.	36 mm.
Snout to Tympanum	16.5	21	9.5
Width of Head	23.5	29	12
Tympanum	3.0	4.0	2.0
Arm	48	50	24
Leg	93	100	43
Tibia	27	33	15
Hindfoot	34	34	14

PARATYPES.—Seven specimens, A. M. N. H. Nos. 5767–5768, 5770–5774 were collected at Likiang with the type. Six additional specimens received from the Rev. John Graham in Yunnan bear the following localities: Nos. 5449 and 12942–12943, Yunnanfu; 6553, Muyang, 40 miles N. of Yunnanfu; and 6593–6594, Wutingchow District.

Werner records six specimens of a *Bufo* from between "Yungning Yüngbei, and Lidjiang" in Yunnan as *Bufo vulgaris asiaticus.* He comments on their small size and on the frequent presence of a tarsal fold. These specimens appear to be plainly referable to the species above described. Stejneger's *Bufo minshanicus* (1926, p. 446) appears to be allied to this form.

Bufo raddei Strauch

Two hundred and six specimens: A. M. N. H. Nos. 17891–18094, Mai Tai Chao, (43 miles S. E. of Paotowchen), Shansi, May, 1922, and 22074, Chen Tzu, Taiyuanfu, Shansi, August, 12, 1922, collected by Clifford H. Pope; and 906, Tsingta, Shantung.

Mr. Pope found this species breeding from May 6 to May 22 in northern Shansi. He comments on the striking differences between the sexes.

Perhaps owing to their capture during the breeding season, the majority of stomachs examined were empty. Five stomachs contained food, which was composed of beetle remains, among which snout beetles, Scarabidæ, and Carabidæ form the great proportion.

Hyla chinensis Günther

A. M. N. H. Nos. 18471, Fukien Province, 18611–18616, Yenping, Fukien, collected by H. R. Caldwell; 5418, Futsing, Fukien, July 28, 1916, R. C. Andrews and Edmund Heller; 5304–5306, 5430–5435, 12944–12945, Yunnanfu, Yunnan, and 6590, Wutingchow District, Yunnan, collected by John Graham.

No. 18471 has the lateral spots confluent into two longitudinal bars with downward projections. In No. 5418 the dark spots are nearly completely fused into a lateral line.

I am unable to find characters to distinguish the Yunnan specimens from the Fukien series.

Hyla immaculata (Bœttger)

A. M. N. H. Nos. 18586, 21743–21790, Wuhu, Anhwei, and 21791–21822, Ningkwo, Anhwei, collected by Clifford H. Pope, September-October, 1921.

Dusky crossbars on the hind limbs are present in only one specimen in the large series at hand. The white lateral line is nearly always distinguishable on the sides of the body, and may extend from the canthus, over the edge of the upper eyelid, and over the tympanum, to the groin, widening somewhat on the sides. A second light line from the nostril, below the eye and tympanum may occasionally be distinguished. The white line above the very narrow dark border of the upper lip is sometimes sharply defined, and usually forms a loop in front of the shoulder and just below and behind the tympanum.

Kaloula borealis (Barbour)

A. M. N. H. Nos. 14827–14937, 26 miles S. of Hsing Lung Shan, Eastern Tombs, Chihli, August 14, 1921, Clifford H. Pope.

Beyond a slight difference in the amount of web, I am unable to find any character to distinguish *Kaloula wolterstorffii* Stejneger (1925, p. 151) from this species. Wolterstorff's Shantung record of *Kaloula verrucosa* must certainly be referred to *borealis*, whose type locality is Antung, Manchuria, directly across Korea Bay from Chefoo. Such a distribution coincides with that of *Bombina orientalis* and *Bufo raddei*, and I am informed by Prof. Arthur Jacot, of Shantung Christian University, that this is a normal faunal relation, characteristic of other groups of animals also. The receipt of a specimen of *Bombina orientalis* from Nanking (the type locality of *Kaloula wolterstorffi*) suggests that both may be transported specimens. The Chinese penchant for the transportation of odd-looking animals, and their use in the *materia medica*, requires a verification of all unusual locality records.

Callula tornieri Vogt may be expected to prove identical with this species, which would in that event be known from Korea, Manchuria, Chihli, and Shantung.

As in so many Brevicipitidæ, the diet of this species shows a strong preponderance of ants. Of forty stomachs examined, twenty contained food, and of these seventeen contained ants or ant remains, five contained beetles or their wing covers, and one contained plant remains, seeds, and small fragments of a fruiting spikelet.

Kaloula verrucosa (Boulenger)

A. M. N. H. Nos. 3135, 5292–5298, 5300–5303, 6432, and 12946–12947, Yunnanfu, Yunnan, collected by the Rev. John Graham.

There seems to be no question of the entire distinctness of *verrucosa* from *borealis*. The Shantung records of *verrucosa* are probably to be placed with *borealis*.

Microhyla eremita Barbour

A. M. N. H. Nos. 5795–5796, Pinghsiang, Kiangsi; 13226, Changsha, Hunan, April 22, 1918, J. W. Williams; 22070, Huping College, Yochow, Hunan, 1922, Clifford H. Pope; and 21823–21927, Ningkwo, Anhwei, September–October, 1921, Clifford H. Pope.

Rana rugulosa Wiegmann

A. M. N. H. Nos. 18456, Yenping, Fukien, H. R. Caldwell; 22048–22069, Ningkwo, Anhwei, September–October, 1921, Clifford H. Pope; 13151–13152, 13155–13157, 13159–13161, 13166–13168, 13171, 13176, 13179, Changsha, Hunan, J. W. Williams and K. F. Yan.

The single specimen from Fukien agrees closely with a series from Formosa in the American Museum, and differs from the Anhwei and Hunan specimens in coloration and in having more numerous and longer glandular ridges. It seems possible, however, that these differences are due in part to different preservation.

Rana limnocharis Wiegmann

Two hundred and sixty-six specimens represent this common species. A. M. N. H. Nos. 5417, Futsing, Fukien, July 28, 1916, R. C. Andrews and Edmund Heller; 18472–18475, 18486–18487, 18573–18577, Fukien Province, and 8083–8091, 18620–18621, Yenping, Fukien, collected by

H. R. Caldwell; 18552–18558, 18622–18631, Wanhsien, Szechwan, September, 1921, and 18598, 18602, 18582, 18585, Yenchingkau, Wanhsien, Szechwan, October, 1921, collected by Walter Granger; 18583, Yochow, Hunan, March 3, 1922; 18584, 21959–31964, Ningkwo, Anhwei, September–October, 1921, 21562–21728, Wuhu, Anhwei, September–October, 1921, and 22075–22100, locality doubtful (probably Ningkwo), collected by Clifford H. Pope; 13193–13195, 13197, 13202, 13205–13210, 13213–13215, 13219, 13232–13234, Changsha, Hunan, 1918–1919, J. W. Williams; 13198, Nanking, Kiangsu, April 17, 1918, J. W. Williams; and 13216–13217, Chikungshan, Honan, August 21, 1918, J. W. Williams.

Rana phrynoides Boulenger

A. M. N. H. Nos. 5428–5429, Yunnanfu, Yunnan, December 15, 1917; and 8149–8150 Wutingchow District, Yunnan, July 26, 1920, Rev. John Graham.

No. 8149, 68 mm. in length, lacks the spines on the breast, though they are present on the fingers. As I find no other differences, this is probably a seasonal or age variation.

No. 8150 has a number of distome trematode parasites attached by means of raised papillæ behind the tongue.

Rana spinosa David

Fifteen specimens, A. M. N. H. Nos. 669, Pinghsiang, Kiangsi; 5410–5415, Futsing, Fukien, July 28, 1916, R. C. Andrews and Edmund Heller; and 8082, 18450–18455, 18457, Yenping, Fukien, H. R. Caldwell.

No. 669 has no pectoral spines and none on the third finger. It measures 70 mm., and thus apparently presents a parallel to the condition of the spines in the half-grown male *phrynoides* noted above.

Rana plancyi Lataste

A. M. N. H. Nos. 13204, Changsha, Hunan, July 9, 1919, J. W. Williams, and 21548–21561, 21729–21736, Wuhu, Anhwei, and 21955–58, Ningkwo, Anhwei, September–October, 1921, Clifford H. Pope.

Rana nigromaculata nigromaculata (Hallowell)

Plate XXXI, Figure 2

One hundred-thirty five specimens, A. M. N. H. Nos. 14683–14818, collected 26 miles south of Hsing Lung Shan, Chihli, August 12, 1921, by Clifford H. Pope, and about thirty tadpoles in various stages of transformation, with the same data, A. M. N. H. No. 14819. Fifty specimens, Nos. 11326–11375, collected by Arthur Jacot at Tsinan, Shantung, are also to be placed with this form.

The relations of this form are discussed below, under *Rana nigromaculata mongolia.*

Our Shantung specimens apparently agree closely with the Japanese specimens examined by Stejneger. The Hsing Lung Shan series does not contain adult specimens, but I have little hesitation in placing it with the Shantung and Japanese subspecies, with which it agrees in the character of the metatarsal tubercle. Typical *nigromaculata* is, therefore, restricted to Japan, Korea, Chihli, and Shantung, with the probable addition of the Siberian Coast Province and Manchuria.

Rana nigromaculata reinhardtii (Peters)

Plate XXXI, Figure 1

One hundred and six specimens are here recognized as a subspecies of *nigromaculata* in south and central China. They were collected as follows: A. M. N. H. No. 666, Pinghsiang, Kaingsi; 8066–8079, 18478, 18481–18484, 18578–18581, Fukien Province, and 8092–8093, 18446–18448, near Yenping, Fukien, collected by H. R. Caldwell; 18458–18466, 18599–18601, 18603–18610, Yenchingkau, Wanhsien, Szechwan, October, 1921, and 18587–18591, 18632, Wanhsien, Szechwan, 1921, collected by Walter Granger; 21534–21547, 21737–21742, Wuhu, Anhwei, and 21965–21983, Ningkwo, Anhwei, collected September–October, 1921, by Clifford H. Pope; 13182–13186, 13191, 13199–13201, 13227–13228, 13231, Changsha, Hunan, J. W. Williams and K. F. Yan.

The relations of this form are discussed below, in connection with the following subspecies.

I have followed Stejneger in preferring to disregard the name *chinensis* Osbeck as unidentifiable. Peter's description of *Hoplobatrachus reinhardtii* mentions the pointed snout which characterizes the present series, and I propose that this name be employed for a subspecies of *nigromaculata* in the Yangtze Valley and Fukien.

Rana nigromaculata mongolia, new subspecies

Plate XXXI, Figure 3

TYPE.—A. M. N. H. No. 18149; ♂; Mai Tai Chao, Shansi, May, 1922, Clifford H. Pope.

DIAGNOSIS.—Derived from *Rana nigromaculata nigromaculata*, from which it differs in having a much more rugose skin, with very short longitudinal folds, shorter legs, especially the tibia, a relatively broader head, and a different style of coloration.

DESCRIPTION OF TYPE.—Vomerine teeth in two rounded groups between the choanæ, their distance from the latter about equal to the distance between them;

nostrils a little nearer the eye than the tip of the snout; distance between nostrils a little less than their distance from the orbits; interorbital space half the width of the upper eyelid; diameter of tympanum equals that of the orbit, and is four times its distance from the latter; first finger a little longer than the second, swollen at the base and provided with a very large velvety pad; toes nearly completely webbed, the web very narrow on the last phalanx of the fourth toe; outer metatarsals well separated; tips of digits tapering, rounded, not at all expanded or grooved; subarticular tubercles distinct; inner metatarsal tubercle large, with a horny edge, its length nearly equal to that of the fifth toe; an indistinct outer tubercle; no tarsal fold; heels not meeting when the limbs are placed at right angles to the body; a well-defined but irregular and rugose dorsolateral fold, from the eyelid to the hip, its breadth at some points greater than that of the interorbital space; dorsal skin coarsely granular, with five irregular longitudinal folds between the dorsolateral folds; a strong glandular fold from the tympanum above the vocal sac to a point considerably behind the insertion of the arm; vocal sacs external, below and behind the tympanum.

Grayish olive above, with faint transverse black markings; limbs with darker crossbars; lower side immaculate; a paler mid-dorsal line, with no trace of paler lines on the dorsolateral fold.

MEASUREMENTS

A. M. N. H. No.	18175, Type	18149
Sex	♂	♀
Snout to Vent	69 mm.	65 mm.
Width of Head	26	25
Tympanum	7	6
Arm	36	38
Leg	105	104
Tibia	30	30
Foot	37	39
Metatarsal Tubercle	6.0	7.0
Fifth Toe	6.5	7.0

PARATYPES.—The twenty-eight paratypes: A. M. N. H. Nos. 18096–18104, Kwei Hwa Cheng, Shansi, June 1–10, 1922; 18122, 18127, 18129, 18132, 18146, 18149, 18168, 18173–18175, 18179–18180, 18182, 18191, 18204, 18213, 18216, 18222, Mai Tai Chao, Shansi, May, 1922; and 11304–11305, base of Tei Pei Shan, Tsing Ling Mts., Shensi, October, 1921, are all in the collection of the Third Asiatic Expedition made for the most part by Clifford H. Pope.

The only noteworthy variation in this series is seen in the two specimens from Shensi, which are distinctly longer legged than the Shansi specimens. They agree with the latter in width of head, dorsal rugosity, and character of the metatarsal tubercle.

Comparative Table of Measurements of the Subspecies of *Rana nigromaculata*

		Length of Body in mm.			Leg/Body			Tibia/Body			Width Head/Body		
	Sex	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean	No. Spec.	Extremes	Mean
Shansi Series	♂	9	62–69	65	9	1.46–1.59	1.53	9	.43–.48	.46	9	.36–.38	.37
	♀	9	34–80	55	9	1.44–1.62	1.52	9	.43–.46	.44	9	.35–.41	.38
Shantung Series	♂	10	53–63	57	10	1.56–1.76	1.62	10	.46–.54	.49	10	.33–.38	.36
	♀	10	57–65	61	10	1.53–1.69	1.60	10	.45–.51	.49	10	.33–.37	.35
Anhwei and Szechwan Series	♂	10	54–72	62	10	1.49–1.69	1.59	10	.48–.54	.51	10	.31–.36	.34
	♀	10	65–95	76	10	1.54–1.73	1.62	10	.47–.54	.51	10	.32–.37	.34
Fukien Series	♂	10	55–67	62	10	1.58–1.71	1.64	10	.49–.52	.51	10	.32–.36	.33
	♀	10	56–85	65	10	1.51–1.71	1.64	10	.48–.56	.52	10	.31–.34	.33

The specimens of *Rana nigromaculata mongolia* are well distinguished from the Shantung series at hand by their much greater rugosity and apparently different style of coloration, as well as by a considerable difference in measurements. The Shansi series agrees with the Shantung specimens in the length of the metatarsal tubercle, and both differ in this character from the south Chinese specimens. These differences may be expressed in key form as follows.

A.—Snout pointed, projecting; metatarsal tubercle much shorter than the fifth toe; size large; spots distinct, transverse; (south and central China).
nigromaculata reinhardtii.

AA.—Snout rounded, little projecting; metatarsal tubercle nearly or quite as long as the fifth toe; size moderate; spots often square or longitudinal, or absent in the adult.

B.—Back rather smooth, with longitudinal ridges; tibia about half the length of the body; limbs longer, head narrower; (Japan, Chihli, Shantung, etc).
nigromaculata nigromaculata.

BB.—Back very rugose, ridges irregular; tibia always less than half the length of the body; limbs shorter, head wider; (Shansi, Shensi, and Inner Mongolia)................................*nigromaculata mongolia.*

Rana noblei, new species

Plate XXXII, Figure 1

Type.—A. M. N. H. No. 5285; ♀; Yunnanfu, Yunnan; John Graham.

Diagnosis.—Allied to *Rana nigromaculata,* from which it is distinguished by its more rounded snout, absence of dorsal folds between the dorsolateral folds, smaller metatarsal tubercle, and very different coloration.

Description of Type.—Width of head equal to the distance from the snout to posterior border to the tympanum; snout broadly rounded, nearly vertical in front, not projecting; interorbital space about one-half the width of the upper eyelid; vomerine teeth in two closely approximated transverse groups between the choanæ tympanum large, very distinct, its diameter slightly greater than the distance between the nostrils; the latter about equidistant from the eyes and point of the snout. First and second fingers equal; tibio-tarsal articulation reaching the eye; heels broadly overlapping when the legs are placed at right angles to the body; tips of digits not dilated; outer metatarsals separated nearly to their bases; toes broadly webbed, the two distal phalanges of the fourth free; inner metatarsal tubercle small, rounded, its length less than half that of the first toe; a small but distinct outer metatarsal tubercle; a strong tarsal fold or ridge from the inner tubercle to the heel, and a less sharply defined one from the base of the fifth toe to the heel. Back with broad dorsolateral glandular folds, continuous from the upper eyelids to the hips, two-thirds the width of the eyelid, which is strongly pitted like the fold; a short glandular fold below the tympanum to a point above the insertion of the arm; very low, rounded and smooth glandular areas between the dorsal folds, with no longitudinal ridges.

Reddish brown above and below, with small sharply defined black spots on the back; a black spot at the base of each arm, a black mark behind the elbow, and one on the front of the forearm; hind limbs without crossbars, with obscure dark mottling on the posterior face of the thighs.

MEASUREMENTS

Snout to Anus	91 mm.
Snout to Tympanum	22
Width of Head	28
Tympanum	7
Arm	48
Leg	146
Tibia	51
Foot	49

This species may represent *Rana nigromaculata* in the Yunnan area. I am unable to identify it with any of the south-Asian frogs listed in Boulenger's revision of 1920.

Rana japonica (Günther)

A. M. N. H. Nos. 18551, 18592–18595, 18617–18619, Wanhsien, Szechwan, 1921, collected by Walter Granger.

These eight specimens are notably distinct from all of the remaining Chinese wood-frogs in the American Museum's collection in having a perfectly straight dorsolateral fold. I do not, however, find any other characters whereby they can be distinguished.

Rana japonica *auct.*

A. M. N. H. Nos. 13187, 13202, 13212, 13230, Changsha, Hunan, 13196, 13220–13225, Nanking, Kiangsu, and 13229, Chikungshan, Honan, collected by J. W. Williams; 18550, 21984–22047, Ningkwo, Anhwei, September-October, 1921, collected by Clifford H. Pope; 22072, Yenping, Fukien, collected by H. R. Caldwell.

The Hunan, Kiangsu, and Anhwei specimens are certainly referable to a single species, and they represent the form which has been commonly referred to *Rana japonica*. Stejneger's revision of the Japanese wood-frogs (1924, p. 73) apparently leaves this form nameless. It is allied to *Rana asiatica* and *Rana amurensis* in having an angulate dorsolateral fold, but it is well distinguished from these species by its more slender habitus, narrower head, and paler coloration. It seems possible that *Rana chenchinensis* David should be used for this species rather than for *R. amurensis.*

The degree of angularity of the lateral fold is certainly subject to variation in this series.

Rana longicrus Stejneger?

A. M. N. H. No. 668, Pinghsiang, Kiangsi; 8094–8095, 22071, near Yenping, Fukien, and 18476–18477, Fukien Province, H. R. Caldwell.

These specimens have a decidedly more slender appearance than the common wood frog of the Yangtze Valley, but it is difficult to find definable characters to separate the two forms. The slenderness of the tibia is perhaps the best differentiating character. The length of the leg ranges from 1.86 to 2.00 times the length of the body, compared with a range of 1.7 to 2.09 in the so-called *japonica*. There is no trace of grooves on the slightly dilated tips of the digits. The width of the head at the angles of the mouth divided by the length from snout to anus, ranges from .29 to .32, averaging .30.

The course of the dorsolateral fold is somewhat angular, and the specimens at hand are thus apparently excluded from *longicrus* as defined by Stejneger. The Fukien specimen recorded as *longicrus* by Boulenger (1920, p. 95) doubtless belongs here. Like the central Chinese "*japonica*," they are apparently without a name. I have refrained from proposing additional names for these two forms in the hope that a more adequate study of the whole "wood-frog problem" may be made in the future.

Rana amurensis Boulenger

A. M. N. H. Nos. 14570–14681, 14820–14826, Hsing Lung Shan, Chihli, August, 1921, Clifford H. Pope.

This series differs from the large Shansi series in having a shorter web and narrower dorsolateral fold, and I therefore have little hesitation in referring them to *amurensis*.

Rana asiatica (Bedriaga)

One hundred and three specimens in the collection, all from Northern Shansi, collected by Clifford H. Pope, May-June, 1922. A. M. N. H. Nos. 18105–18118, Kwei Hwa Cheng; 22073, 18119–21, 18123, 18126, 18128, 18130–18131, 18133–18145, 18147–18148, 18150–18167, 18169–18172, 18176, 18178, 18181, 18183–18190, 18192–18203, 18205–18212, 18214–18281, 18217–18221, 18223–18224, Mai Tai Chao.

This species has the angular course of the dorsolateral fold behind the eye well marked. The only notable variation is in the amount of the dorsal black markings and in the extent of the lateral granulation of the skin.

Rana pleuraden Boulenger

Forty-four specimens in the American Museum's collection represent this species. A. M. N. H. Nos. 5775–5791, Likiang, Yunnan, October 4, 1916, collected by R. C. Andrews and Edmund Heller; 5286–5291, 5427, 5436–5444, 5763–5764, and 13451–13453, Yunnanfu, Yunnan, and 6528, 6591–6592, 8145–8147, Wutingchow District, Yunnan, collected by John Graham.

The Likiang specimens agree excellently with the topotypes from Yunnanfu.

Rana grahami Boulenger

A. M. N. H. Nos. 5284, Yunnanfu, Yunnan, John Graham, and 5766, Likiang, Yunnan, October 4, 1916, collected by R. C. Andrews and Edmund Heller, represent this species.

The resemblance of this form to *Rana andersonii* is extraordinary. It apparently replaces the latter in the central Yunnan area. The Likiang specimen extends the known range of *grahamii* to the northward, as it has hitherto been recorded only from Yunnanfu.

Rana guentheri Boulenger

Four specimens in the collection: A. M. N. H. Nos. 667, Pinghsiang, Kiangsi; 5419–5420, Futsing, Fukien, July 28, 1917, R. C. Andrews and Edmund Heller; and 18596, Luanshikau, Wanhsien, Szechwan, September, 1921, collected by Walter Granger.

These specimens agree with Boulenger's figure (1882, Pl. IV, fig. 2) except for a somewhat shorter body, and with his most recent description (1920, p. 133). The coloration of *guentheri* suggests that of *plancyi*, the two perhaps forming a pair somewhat like *R. grahami* and *R. andersoni*, or *R. adenopleura* and *R. pleuraden.*

Rana caldwelli, new species

Plate XXXII, Figure 2

TYPE.—A. M. N. H. No. 18485; ♂; Fukien Province (probably near Yenping); H. R. Caldwell.

DIAGNOSIS.—Allied to *Rana adenopleura*, from which it is distinguished by having a more projecting snout, rougher skin, and the dorsolateral glandular folds broken up posteriorly.

DESCRIPTION OF TYPE.—Vomerine teeth in small oblique groups between the choanæ, nearer to each other than to the latter.

Head a little broader than long; snout obtusely pointed, projecting well beyond the mouth, longer than the eye; canthus rostralis obtuse; loreal region moderately oblique, concave; nostril equidistant from eye and tip of snout; distance between the nostrils greater than the interorbital width; tympanum very distinct, five-sixths the diameter of the eye, and four times its distance from the latter.

Fingers rather slender, with slightly swollen tips, with a rather indistinct groove on each side; first a little longer than the second; subarticular tubercles prominent.

Hind limb long, the heel reaching the tip of the snout; heels strongly overlapping when the legs are placed at right angles to the body; tibia a little less than twice in the length from snout to vent; toes slender, the tips dilated into small discs with sharply defined lateral grooves, moderately webbed, two and a half phalanges of the fourth toe free; outer metatarsals separated nearly to their base; a tarsal fold present; inner metatarsal tubercle about two-fifths the length of the inner toe; a small round outer metatarsal tubercle.

Skin finely rugose; a moderately broad glandular fold from above the tympanum to the groin, broken up posteriorly; the distance between the folds, on the middle of the back, four and one-half times in the length from snout to vent.

Grayish brown above, with a light vertebral line; a distinct dark band on each side of the head passing through the eye; dorsolateral fold dark edged; limbs with dark crossbars; hinder side of thighs light, marbled with brown; lower parts white, throat brownish; a black mark at the base of the arm, and one at the groin.

The first finger has a feeble pad, covered with a velvet-like grayish layer, on its inner side; a large flat gland, above and behind the axilla, is present.

MEASUREMENTS OF TYPE AND PARATYPE

A. M. N. H. No.	18485	18572
Snout to Vent	49 mm.	31 mm.
Snout to Tympanum	14	10
Width of Head	18	10
Tympanum	5	3
Arm	33	20
Leg	90	60
Tibia	28	19
Foot	29	19

PARATYPE.—A. M. N. H. No. 18572, with no other data than Fukien Province, agrees closely with the type.

This species is apparently the mainland representative of the Formosan *R. adenopleura*. A specimen from Yenping has been recorded by Stejneger under the latter name (1925*a*, p. 23).

Rana andersonii Boulenger

Two specimens from western Yunnan, A. M. N. H Nos. 5408–5409, Tengyueh, April 24, 1917, collected by R. C. Andrews and Edmund Heller; and four specimens from Fukien collected by H. R. Caldwell, No. 8081, mountains near Yenping, August 1920, 18449, Yenping, April 24, 1921, and 18479–18480, Fukien Province.

There are decided differences between the Fukien and Yunnan specimens at hand. The former have a finely granulate dorsal skin, and much more distinct dorsal spots. The Tengyueh specimens are nearly smooth above, with low rounded warts, and much more distinct lateral warts. The variation in the size of the tympanum in the Fukien specimens indicates that *R. schmackeri* must either be united with *andersonii* or applied to its representatives in eastern China.

Rana ricketti Boulenger

Twenty specimens of this striking species were collected by H. R. Caldwell in Fukien. A. M. N. H. No. 8080 is from the mountains near Yenping, August 1920, while the remaining series, doubtless also from the Yenping area, is labeled simply Fukien Province.

The males are without evident vocal sacs. They have the lower joint of the first finger much enlarged, covered with evenly distributed round tubercles which are not at all horny.

The measurements of two specimens are as follows.

A. M. N. H. No.	18567	18568
Sex	♂	♀
Snout to Vent	56 mm.	61 mm.
Snout to Posterior Border of Tympanum	18	19
Width of head	19	20
Tympanum	2	2.5
Arm	35	36
Leg	91	95
Tibia	31	33

Polypedates exiguus (Bœttger)

Two specimens, A. M. N. H. Nos. 670, Pinghsiang, Kiangsi, and 13192, foothills across Siang River, Changsha, Hunan, November 25, 1918, J. W. Williams.

This form was based on a juvenile specimen, and I am by no means sure of the identification of the present specimens with it. No. 13192 has the skin of the back nearly smooth; coloration very like that of *dennysii* but with a row of well-defined white spots along the sides; web between the outer fingers from the bases of the last phalanges, a little shorter between the inner fingers; toes webbed to the discs, but more deeply incised than in *dennysii*, the fourth toe having only a narrow margin of web on the last phalanx; prepollex strongly developed; a pectoral area between the shoulders smooth. No. 670 agrees closely with the Changsha specimen in coloration and extent of webbing, but has a much more rugose skin on the back and head. It was identified as *dennysii* by Wolsterstorff, but it appears to be amply distinct from that species.

Polypedates dennysii (Blanford)

Three specimens, A. M. N. H. Nos. 5416, Yuchi, Fukien, May 28, 1916, R. C. Andrews and Edmund Heller; 18445, Yenping, Fukien, September 26, 1921, H. R. Caldwell, and 18566, Fukien Province, H. R. Caldwell.

This large species is well characterized by the fully webbed toes and fingers. The disc of the third finger is wider than the diameter of the tympanum.

All three specimens are marked above (on a purple ground color) with dark brown spots, each of which is bordered by a ring of light brown. The distribution of these spots suggests that they are due to shot marks, but no lesion is discernible.

BIBLIOGRAPHY

BARBOUR, THOMAS. 1908. 'Some New Reptiles and Amphibians.' Bull. Mus. Comp. Zoöl., LI, pp. 313–325, fig.

1909. 'Notes on Amphibia and Reptilia from Eastern Asia.' Proc. New England Zoöl. Club, IV, pp. 53–78, Pls. VI–VII.

1909*a*. 'On the True Status of the Genus *Cacopoides*.' Proc. Acad. Nat. Sci. Phila., pp. 401–405, Pls. XVII–XVIII.

1912. 'Some Chinese Vertebrates. Amphibia and Reptilia.' Mem. Mus. Comp. Zoöl., XL, pp. 125–136, Pls. I–II.

1920. 'An Undescribed *Microhyla*.' Occ. Papers Mus. Zool. Univ. Mich., No. 76, pp. 1–4.

1920*a*. 'A Preoccupied Name in *Hyla*.' Copeia, p. 98.

BŒTTGER, OSKAR. 1888. 'Aufzählung einiger neu erworbener Reptilien aus Ost-Asien.' Ber. Senck. Ges., 1888, pp. 187–190.

1894. 'Materialien zur Herpetologischen Fauna von China. III.' Idem, 1894, pp. 129–152, Pl. III.

BOULENGER, GEORGE ALBERT. 1882. 'Catalogue of the Batrachia Salientia s. Ecaudata in the collection of the British Museum.' London, British Museum, 8vo. xvi +503, pp. text figs. and Pls. I–XXX.

1882*a*. 'Catalogue of the Batrachia Gradientia s. Caudata and Batrachia Apoda in the Collection of the British Museum.' London, British Museum. 8vo. viii+127, pp., Pls. I–IX.

1890. 'A List of the Reptiles and Batrachians of Amoorland.' Ann. Mag. Nat. Hist. (6) V, pp. 137–144, Pl. IX.

1891. 'A Contribution to the Knowledge of the Races of *Rana esculenta* and Their Geographical Distribution.' Proc. Zoöl. Soc. London, pp. 374–384.

1899. 'On a Collection of Reptiles and Batrachians made by Mr. J. D. Latouche in N. W. Fokien.' Idem, pp. 159–172, Pls. XVI–XIX.

1904. 'Descriptions of New Frogs and Snakes from Yunnan.' Ann. Mag. Nat. Hist., (7) XIII, pp. 130–134.

1905. 'Description of a New Batrachian of the Genus *Bombinator* from Yunnan.' Idem, (7) XV, pp. 188–189, text fig., Pl. XIII.

1905*a*. 'Description of a New Newt from Yunnan.' Proc. Zoöl. Soc. London, pp. 277–278, Pl. XVII.

1918. 'On the Races and Variation of the Edible Frog, *Rana esculenta* L.' Ann. Mag. Nat. Hist., (9) II, pp. 241–257.

1920. 'A Monograph of the South Asian, Papuan, Melanesian and Australian Frogs of the Genus *Rana*.' Rec. Indian Mus., XX, pp. 1–226.

DUNN, EMMETT RIED. 1923. 'The Salamanders of the Family Hynobiidæ.' Proc. Amer. Acad. Arts Sci., LVIII, pp. 445–523.

PETERS, W. C. H. 1867. 'Über Flederthiere und Amphibien.' Monatsber. Akad. Wiss. Berlin, pp. 704–712, Pl.

SCHMIDT, KARL PATTERSON. 1925. 'New Reptiles and a New Salamander from China.' Amer. Mus. Novitates, No. 157, pp. 1–5.

1925*a*. 'New Chinese Amphibians and Reptiles.' Idem, No. 175, pp. 1–3.

1926. 'Some Questions about the Common Toads of Central China.' China Journ. Sci. Arts, IV, pp. 75–76.

STEJNEGER, LEONHARD. 1907. 'Herpetology of Japan and Adjacent Territory.' Bull. U. S. Nation. Mus., LVIII, pp. xx, 577, 409 text figs., Pls. I–XXXV.

1924. 'The Woodfrogs of Japan.' Proc. Biol. Soc. Wash., XXXVII, pp. 73–78.

1925. 'Description of a New Scincid Lizard and a New Burrowing Frog from China.' Journ. Wash. Acad. Sci., XV, pp. 150–152.

1925*a*. 'Chinese Amphibians and Reptiles in the United States National Museum.' Proc. U. S. Nat. Mus., LXVI, Art. 25, pp. 1–115, text figs. 1–6.

1926. 'A New Toad from China.' Journ. Wash. Acad. Sci., XVI, pp. 445–446.

VOGT, THEODOR. 1913. 'Zur Reptilien- und Amphibienfauna Koreas und Japans.' Sitzber. Ges. Naturf. Freunde Berlin, pp. 219–221.

WERNER, FRANZ. 1924. 'Ergebnisse der Expedition Dr. Handel-Mazetti's nach China 1914 bis 1918 auf Kosten der Akademie der Wissenschaften in Wien. Über Reptilien und Amphibien aus SüdChina.' Denkschr. Akad. Wiss. Wien (math.-natur.), XCIX, pp. 39–58.

WOLTERSTORFF, W. 1906. 'Über *Callula verrucosa* Boulenger von Tsingtau.' Zool. Anz., XXX, pp. 554–558.

1906*a*. 'Über die von Herrn Dr. Kreyenberg in Ostasien gesammelten Frosch- und Schwanzlurche.' Abh. Mus. Naturk. Magdeburg, I, pp. 123–164, Pl.

Plate XXXI

Fig. 1. *Rana nigromaculata reinhardtii* (Peters), Ningkwo, Anhwei.

Fig. 2. *Rana nigromaculata nigromaculata* (Hallowell), Tsinan, Shantung.

Fig. 3. *Rana nigromaculata mongolia* Schmidt, Mai Tai Chao, Shansi.

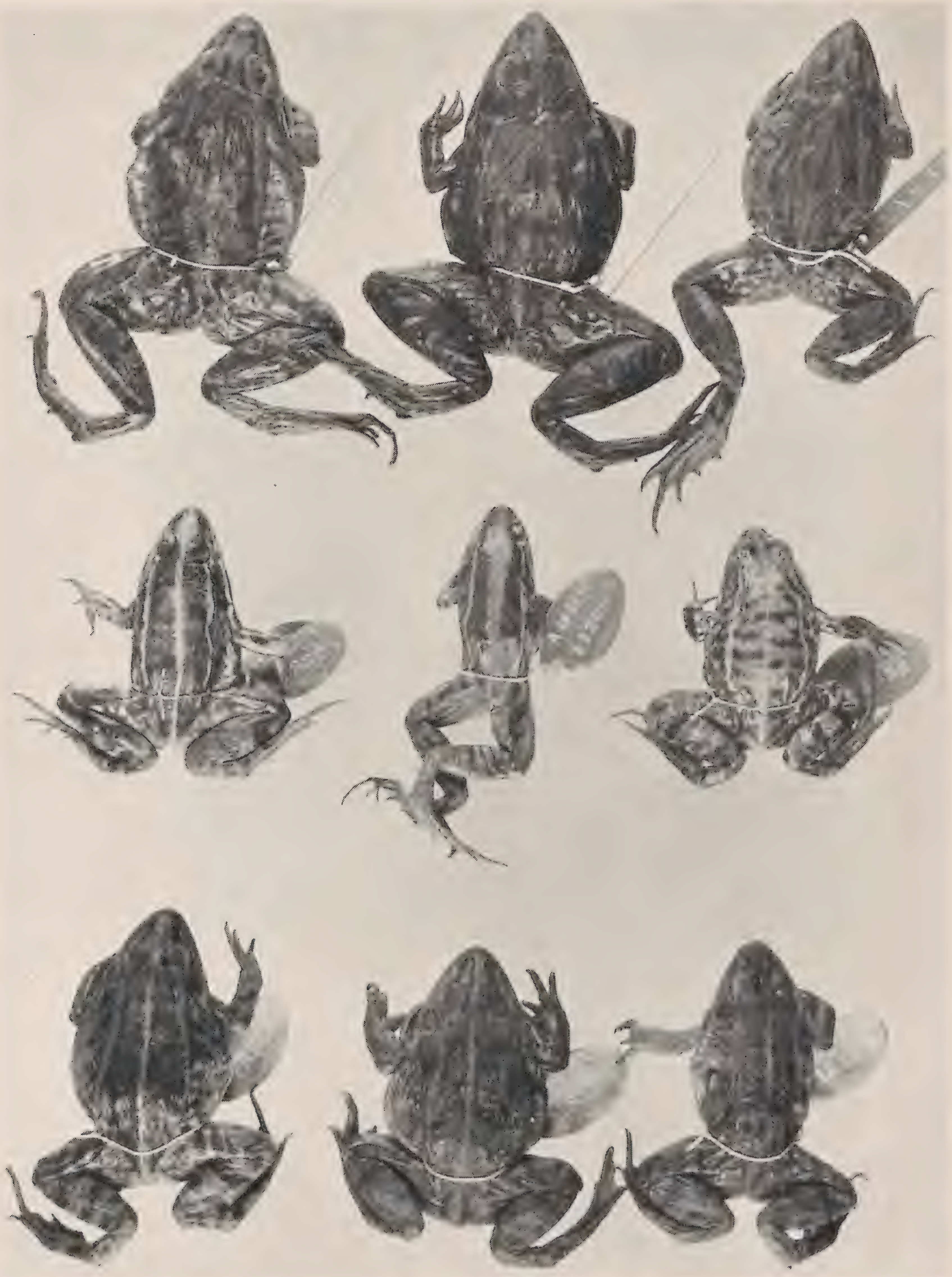

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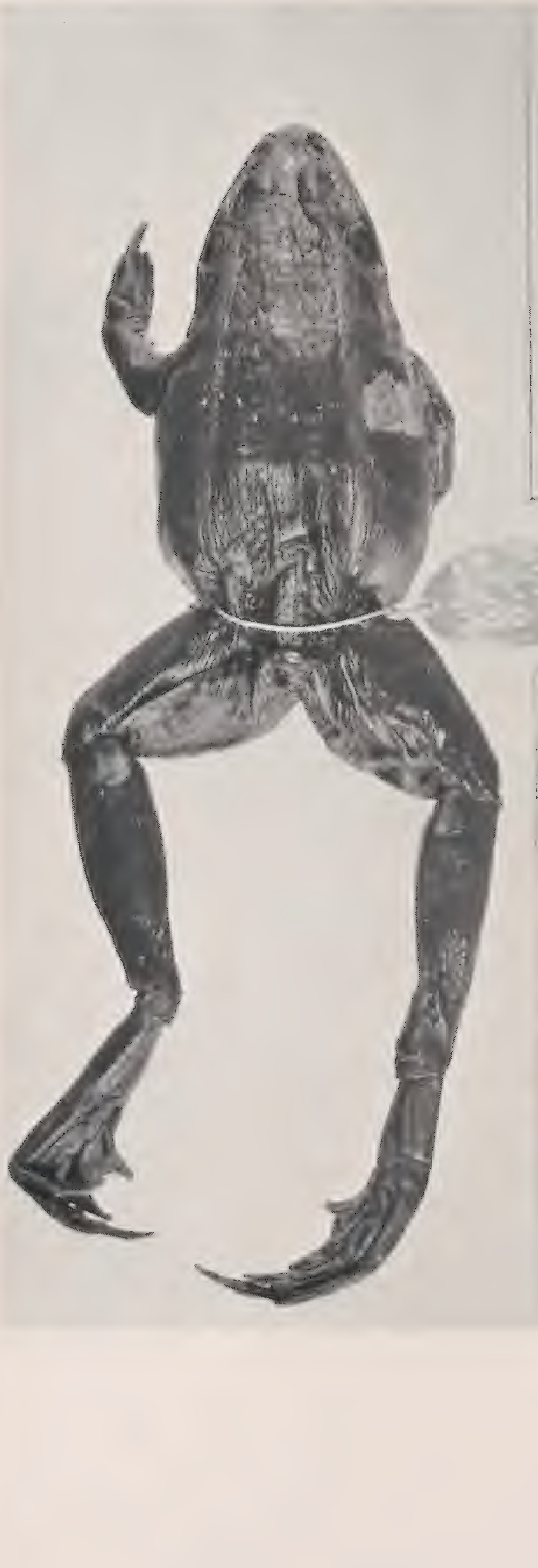
Plate XXXII

Fig. 1. *Rana noblei* Schmidt, type.
Fig. 2. *Rana caldwelli* Schmidt, type.
Fig. 3. *Bufo andrewsi* Schmidt, type.



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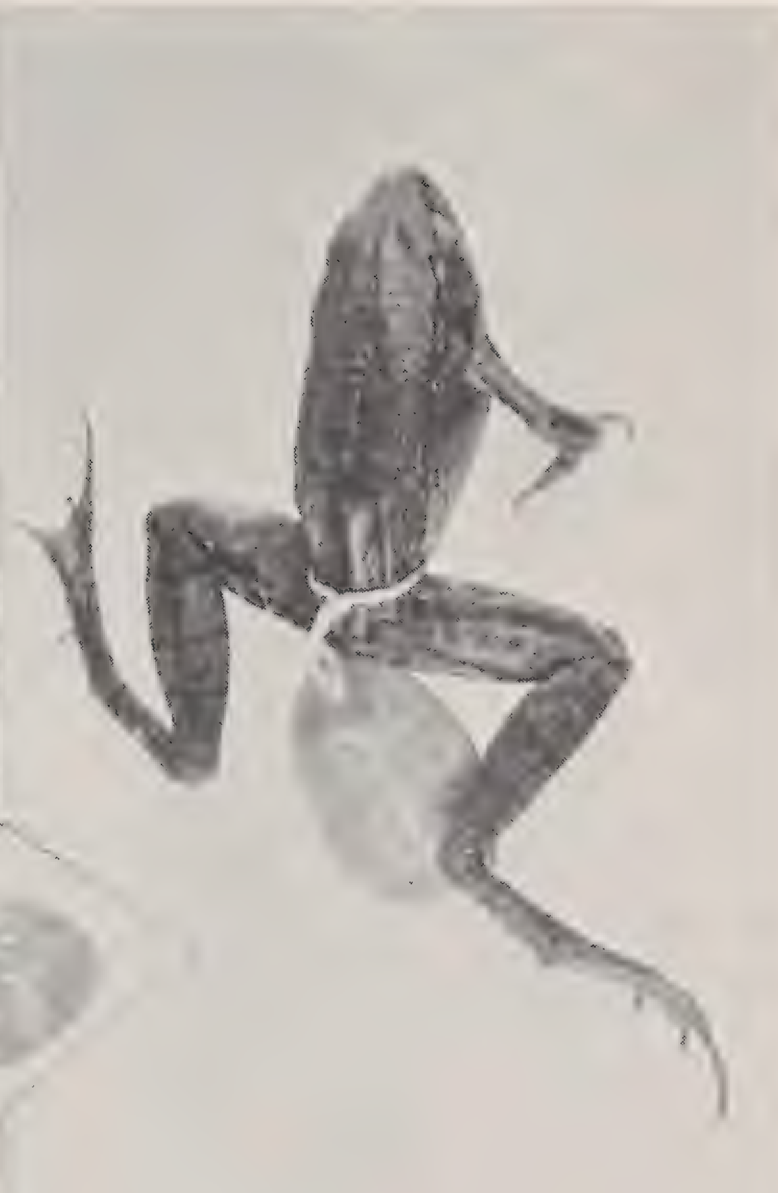

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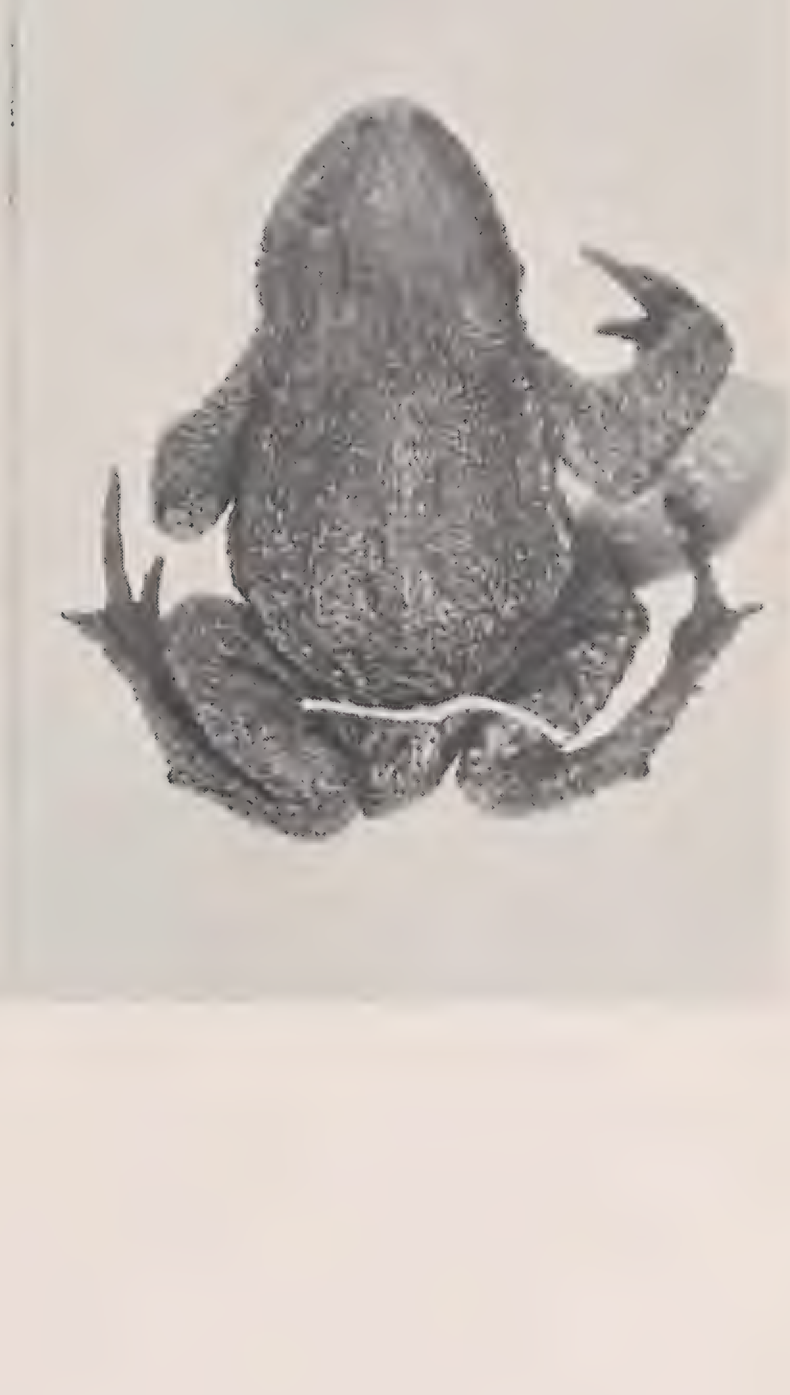

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